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RICHARD P. ROTHWELL, C.E., M.E.,
ROSSITER W. RAYMOND, Ph.D.,
CHARLES KIRCHHOFF, Jr., M.E., } Editors.

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Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus *; and only for articles so signed is he responsible.

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THE gas battle has begun. The Consolidated Gas Company has duly announced to consumers that it will charge $1.75 per thousand feet to those using less than one hundred thousand cubic feet, and $1.50 to those consuming more than that quantity.

IT is announced by the British Consulate that an International Inventors' Exhibition will be opened in May, 1885, in London, to be confined to such inventions as have been brought into use since 1862. We understand that the qualifications as to acceptance are to be very liberal, provided the applications are made previously to December 31st.

DURING the current week, there have been quite large sales of lead at 3·50 cents, and it may be said that practically the fall trade is now over. That it has been a very severe disappointment can not be denied, since it leaves the metal in no particularly good shape to withstand the pressure of a long dull season. Of course, production generally falls off to some extent during the winter months, thus offseting a lull in the demand, but it is hardly to be hoped that the statistical position will escape some slight unfavorable change. We have repeatedly insisted that, in spite of the dull times, the consumption has thus far coped very well with a production that certainly has not fallen off as compared with last year. On the contrary, we are inclined to believe that the heavy output of 1883 will be surpassed, because of the increase of the make of New Mexico, Idaho, and Montana. It is not surprising, therefore, that those interested in lead are beginning to look forward to the future of the metal with some apprehension.

WE hear a good deal of complaint on the part of our consulting engineers that much of their time is occupied by visitors who ask innumerable questions of a strictly professional character, and bearing directly upon the financial successes of the enterprises that they have or claim to have entered into. It never appears to enter the minds of these people who try to pick the brains of consulting engineers that the time of the latter is money to them, as it is to any other business or professional man. No one would dream of entering a lawyer's or a physician's office without being prepared to pay for the advice or the opinion given him, and yet the same persons will think nothing of talking by the hour on their wonderful property, detail their woes and troubles in connection with it, and ask to be instructed as to the best means of putting their enterprise on a sound basis. At the end of the interview, they are profuse in their thanks, and smilingly bow their way out. Our mining engineers have been wonderfully good-natured with this class of clients, and have thereby, we are convinced, only aggravated the evil. It lies largely with them to stop it by simply following the practice of other professional men.

AMONG the many interesting tables in Mr. BURCHARD'S report is the following, giving the production of the precious metals in the world for 1883:

	Gold		Silver.	
Countries.	Kilos.	Dollars.	Kilos.	Dollars.
United States.	45,140	30,000,000	1,111,457	46,200,000
Russia	35,913	23,867,935	7,781	323,427
Australia	39,873	26,500,000	1,924	80,000
Mexico	1,438	955,639	711,347	29,568,576
Germany	457	303,722	230,694	9,589,300
Austria-Hungary	1,638	1,088,615	48,708	2,024,645
Sweden	37	24,590	1,583	65,800
Norway	.....	.....	5,645	234,645
Italy	109	72,375	432	17,949
Spain	..	.....	74,500	3,096,220
Turkey	10	6,646	2,164	89,916
Argentine Republic	118	78,546	10,109	420,225
Colombia	5,802	3,856,000	18,283	760,000
Bolivia	109	72,375	384,923	16,000,000
Chili	245	163,000	128,106	5,325,000
Brazil	952	632,320	.....	.....
Japan	181	120,080	8,488	353,825
Africa	3,000	1,993,800	.....	.....
Venezuela	5,022	3,338,058	.....	.....
Dominion of Canada	1,435	954,000	1,641	68,205
France	.....	.....	.....	.....
Total	141,479	94,027,901	2,747,785	114,217,733

Mr. BURCHARD appears to have taken great pains to collect full data, and in an appendix gives the details of the correspondence upon which many of his estimates are based. He adds figures for 1881 and 1882, which show clearly the steady decline in the output of gold throughout the world, the total for 1881 being $103,023,078 and for 1882 $98,599,588, almost all the leading gold-producing countries, with the exception of Venezuela, participating in the backward movement. For silver, on the contrary, there is almost as uniform an increase in the output, rising from $102,168,354 in 1881 to $109,952,251 in 1882, and $114,217,733 in 1884.

THE efforts of Mr. HORATIO C. BURCHARD, Director of the Mint, to get at the consumption of the precious metals in the arts and for ornamentation appear to have been more successful during the past year than formerly. In his annual report, which has just come to hand, he states that 2734 persons or firms engaged in the manufacturing or the repair of articles of ornamentation report the consumption of nearly $14,500,000 worth of gold, and over $5,500,000 worth of silver, a total of over $20,000,000.

Mr. BURCHARD submits the following details concerning the various uses to which this large quantity of metal was put:

	Gold.	Silver.	Total.
Watch-cases	$3,598,308	$1,845,599	$5,443,907
Watch-chains	827,000	23,544	850,544
Dental supplies	37,912	6,738	44,650
Pens	145,924	6,730	152,654
Instruments	5,199	13,990	19,189
Leaf	1,084,624	46,883	1,131,707
Plate	528,868	2,066,294	2,595,162
Spectacles	215,428	23,782	239,210
Chemicals	31,611	416,419	448,030
Jewelry and watchmakers' supply	79,227	8,331	87,558
Jewelry and watches	7,905,163	1,098,220	9,003,383
Total	$14,459,464	$5,556,530	$20,015,994

The character and the value of the precious metals reported by manu

facturers, jewelers, and others, used by them during the calendar year of 1883, is exhibited in the following table:

CHARACTER.	Gold.	Silver.	Total.
United States coin	$4,875,587	$216,637	$5,092,224
Stamped United States or refinery bars	7,137,761	4,552,172	11,689,933
Old jewelry, plate and other old material	876,641	221,951	1,098,592
Foreign coin	194,400	154,273	348,673
Native grains, nuggets, etc	702,387	71,557	773,944
Wire or rolled plate	672,688	839,940	1,012,628
Value	$14,459,464	$5,556,530	$20,015,994

It seems probable that Mr. BURCHARD's figures are a close approximation to the actual consumption of the precious metals for the purposes specified. A glance at the first table will reveal how well it reflects the well-known preferences for the one or the other metal for special uses.

THE NEW YORK MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

THE THIRD SESSION

of the Society, on Thursday afternoon, was opened by the reading of a paper by Mr. William Hewitt, of Trenton, N. J.

A NOVEL HAMMER-HEAD AND DIE.

In the ordinary construction of steam-hammers, the head and die are usually secured to the piston-rod, which is slightly tapering at the end, by means of keys applied to a slot in the connection between piston-rod and head, and a dovetail joint in the connection between the head and die. The objection to this and all other modes of connection by means of keys is, that the unequal expansion and contraction of both the head and die continually knock the keys loose—no matter how tightly they may be driven—necessitating frequent stoppages to tighten up, which are sufficiently annoying in themselves, even if they do not lead to more serious consequences, such as the bursting of a head or the cracking of a die; and although these parts are generally made of cast-steel, such events are not of uncommon occurrence, especially in shingling, where foul blows are frequent.

The device that Mr. Hewitt presented to notice was applied a few years ago to a Sellers hammer in the works of the Trenton Iron Company, and has effectually overcome the difficulties mentioned, being a much cheaper as well as better arrangement. The hammer-head is secured to the lower extremity of the piston-rod by a tapering split ring and a circumscribing wrought-iron band. A series of lugs projects radially from the exterior face of the lowest portion of the head, and a corresponding series of lugs projects similarly from the exterior face of the uppermost portion of the die, the two series of lugs in the set of the parts being so disposed as to be vertically aligned in corresponding pairs.

The parts are joined in the following manner: The wrought-iron band is first shrunk upon the head, to keep it from fracturing, and the head, with the band shrunk on it, is then heated to a red heat. The tapering sleeve or ring, which is split like a piston-ring, is now slipped over the end of the piston-rod; the head, while red-hot, is placed around this, and the die placed so that the lugs on it come directly opposite those on the head. The tapering ring is then driven down tightly with a sledge, the head left to cool, and finally, the bands are shrunk around the lugs. The opposing faces of the lugs are faced off or beveled, so that they do not touch in the contact of the die with the head, in order to provide against the possibility of their receiving or sustaining any portion of the shock from the blows of the hammer, which otherwise would break or destroy them. The bands around the lugs are, in shrinking, of course, subjected to an enormous tension, which retains them fixedly in position and holds the die immovably in place until it is worn out, when it is removed by cutting the bands and replacing by a new die. The hammer-head, on cooling, shrinks sufficiently, as practice has proved, to prevent the tapering ring from slipping or shaking loose. A leather washer is placed between the end of the piston-rod and die, to provide for a slight amount of elasticity and to ameliorate somewhat the force of the severe blows. The tendency of the blows is to drive the tapering ring in tighter, and the force thus exerted outwardly against the head is so great that it would soon break it if it were not for the wrought-iron band, which effectually prevents this. The head and die are made of cast-iron.

In discussion, Professor Sweet thought that the rod might taper into the head without a separate tapering ring, one part less thus being needed, but changed this opinion when Mr. Davis pointed out that the tapering ring served a good purpose, inasmuch as its bottom is above the head, thus admitting of some give. Mr. Davis further stated that in the shops with which he was connected—those of the Philadelphia & Reading Coal and Iron Company—they had several large hammers without the leather referred to by Mr. Hewitt, which had lasted well for five years. The weight of one of these hammer-heads was 650 pounds.

Mr. A. C. Hobbs followed with a talk on locks and their failings. The various classes of locks and keys were illustrated by colored charts.

Mr. Frederick A. Scheffler, of Erie, Pa., then read the following paper on

A NEW METHOD OF CONSTRUCTING HORIZONTAL TUBULAR BOILERS.

Since the early history of steam-boilers, science, in its progress toward a more efficient and at the same time a more simply constructed boiler, has been constantly nearing the perfection looked and hoped for by the many changes for the better that have been made in the rolling of boiler plates, of either iron or steel. It is true that improvements have been made more rapidly in the manufacture of steel plates for boilers than in iron plates, due chiefly to the fact that the steel plates have no grain to be considered in rolling them either lengthways or crossways for their use in boilers, whereas with iron the peculiarity of its fibrous structure is an objection to the manufacture of large plates.

Were it not for the superiority (as the writer firmly believes) of steel over iron for use in boilers of all sizes, and the fact that plates from the smallest dimensions to the enormous size of sixteen feet long and one hundred inches wide can be obtained, there could be no possibility of a paper at this time on the subject.

When steel can be obtained, for use in boilers, having a guaranteed tensile strength of 60,000 pounds per square inch, an elastic limit of 30,000 pounds, an elongation of 20 per cent in an 8-inch specimen, and a reduction of area of from 45 to 50 per cent, and which will also bend down close when cold, without fracture, it is very apparent that the superiority of steel over iron can not be questioned. Another favorable point is, that this quality of steel is homogeneous, and it will not blister.

The fact that these large plates of steel can be obtained caused this question to arise in the mind of the president of the works where the writer is employed: Why not construct boilers of steel in two plates only? The advantages are numerous, and of the best kind.

It is well known that attempts have been made, and these attempts have sometimes been successful, to make a boiler of the style in question with a single plate on the bottom, by hammering and swaging into shape. No reliance can be placed on boilers made by this method, as the iron (when iron is used) loses its toughness and good qualities by being subjected to such a large amount of hammering as must be done to form such a construction. Mr. D. K. Clark refers to some tests that he made on welded iron plates, and, although some of the tests were very satisfactory, yet the danger lest it be not known positively whether the weld would be a substantial one or not causes a reluctance in recommending boilers with welded plates. This method is also very costly, and with the uncertainty and cost combined taken into consideration, this method has been abandoned.

By making a boiler entirely of two plates only (except, of course, the flue sheets), the following advantages are apparent:

1. By carrying the longitudinal seams above the water-line (say two inches above the top of the flues) and closing up the brick setting at that hight, there will be no seam exposed to the fire other than the lower half of the back head. This is a positive advantage over boilers as commonly constructed, when there are from four to eight seams exposed to the fire.

2. By thus eliminating the exposure of the seams, a greater reduction is apparent of the chances for a leakage around the rivets.

3. The advantage of equal expansion and contraction is so great as also to be of great benefit, and the usual excessive strains are largely reduced.

4. For cleaning the boiler, no question can be raised as to the benefit of a single plate on the bottom. There are no rivets for lodgment of scale, sediment, etc., and there are no seams to interfere with a thorough scraping of the shell.

5. There being no seams vertically, the boiler must be stronger, as there are no holes punched for rivets.

This latter fact is the one that will give rise to the most serious discussions of this paper. It may be questioned whether one large plate extending the whole length of the boiler will be as strong as the same plate, cut into two or three pieces and then single-riveted together. Mr. Scheffler holds that the former is the stronger of the two, and that, if the boiler is properly supported, as all boilers should be, there will not be any trouble with the boiler springing or the plates warping.

A set of hollow rolls 16 feet 4 inches long, in the clear, and each roll 14 inches diameter, and $2\frac{5}{8}$ inches thick, was designed some time last spring by the former superintendent. When the writer took charge, it was proposed pushing the matter forward as soon as possible, and patterns were made immediately and then put in the hands of the molders.

The castings were soon under way, and by the first of September the rolls were ready for the first experiment. They were geared to run by belting from the main line running 120 revolutions per minute, and the speed reduced to 3 revolutions per minute, on the rolls. Eight-inch single belting was used. The first sheet experimented with was for a 36-inch by 10-foot boiler, and the plate was 62 inches wide and 10 feet long, by $\frac{7}{32}$ inch thick, of steel. The rolls worked somewhat hard at first, being new, and they were allowed to run two days to stretch the belting as much as possible. The stretch was then taken up and the plate entered into the rolls. This plate went through in good shape, and so did the top plate—the latter rolling up easier than the bottom plate, because the sheet had been punched for the dome and a hole cut for the man-hole. A larger plate was tried next—a plate 12 feet long, $\frac{9}{32}$ inch thick—when it was found that the gearing was insufficient for the work. An alteration was then made, new gears being substituted, by which the power was largely increased, and 10-inch belts were used. The 12-foot plate was then rolled. The amount of power required to roll this immense sheet of steel was entirely beyond expectation. When a 12-foot plate $\frac{5}{16}$ inch thick was attempted, it was rolled entirely by "coaxing," as the belts would slip, although the pulleys were quite large in diameter and as wide as convenience would permit. The pressure exerted on each roll at its circumference, or at the pitch line of the gears on the rolls (the latter being the same diameter as the gears), is estimated to have been 15,000 pounds, and was supposed to have been sufficient to roll a plate of any size that the rolls would take in. The idea of belting was at once abandoned, and an engine was specially constructed to gear directly.

On the 23d of September, 1884, the first 60-inch boiler, 16 feet long, $\frac{3}{8}$ inch thick, of steel, was constructed in two plates. This is the *first* boiler of this description ever made in this country, and, as far as the writer has knowledge, in any other country. It is found that a greater degree of accuracy can be maintained in getting the rivet-holes in direct line, and thereby the likelihood is greatly reduced that the boiler-makers will have the chance to use the detestable drift-pin, that greatest of all evils in boiler construction.

Some members may have their objections to the use of steel for boilers, and claim that it is so recent in the market that the method of handling it in manufacturing establishments is not yet sufficiently well developed to be relied upon. The writer heard of a gentleman, a short time ago, who objected to the use of steel for boilers for the above reason. The manufacturers who make a specialty of using this material of course have the advantage over those who use it only on occasional orders; but I do not hesitate to say that, since this material has been in use for upward of eight years, there has been every opportunity that could be desired for all interested to avail themselves of the proper knowledge of the handling of it.

If locomotive boilers constructed of steel should be made with only

one course in two plates, from the throat-sheet to the smoke-box, there would undoubtedly be a great reduction of the liability to leakage and wear and tear, and probably a longer life of the boiler would be secured, although the fire-box is generally the first place to need repairs. It is the writer's belief that this new construction of horizontal tubular boilers will be the method of the future for this type, and he hopes that the few points brought forth in this paper will be of service in stimulating discussion and further progress in this direction.

Mr. Scheffler's paper stirred up considerable discussion, which is reported as follows in the *American Engineer*, by Mr. A. R. Wolff, associate editor: Mr. Stirling expressed his satisfaction at any advance in the construction of horizontal tubular boilers, inasmuch as he believed them to be possessed of certain advantages that would insure their use for a long time to come. The main point was, the large water surface which appealed so strongly to the fireman, since the water-level is the main thing he has to take care of. He considered the lack of amount of water-level one of the principal defects in water-tube boilers. While conceding the objection that the large shell of the tubular boiler did not admit of the highest steam pressures, he maintained that as a fact water-tube boilers are not used largely for power purposes, and not at all on steamships. He desired to ask why the water-tube boilers were not in use on steamers when so much money had been spent to introduce them into that practice?

Both Messrs. Emery and Kent maintained that it was out of place at the time to discuss the relative merits of horizontal and water-tube boilers; but Mr. Stratton pointed out that three of the vessels in the French navy, one of them for over six years, had had water-tube boilers in successful use. The Voltigeur, one of these steamers, carries 150 pounds of steam. He asserted that any difficulty due to less water surface in tubular boilers was overcome by the use of mechanical separators; the tubular boiler weighed 65 pounds per foot of heating surface, while the water-tube weighed only 40 pounds. In answer to Mr. Stirling's question—how it was that the water-tube boilers had failed in the Guion Steamship Line Montana, notwithstanding that a large sum had been spent in the matter—Mr. Stratton said that the circulation in these special boilers of the Howard type had been bad. Mr. Emery insisted on the necessity of securing high-grade steel for boiler shells, as it was only this that was not injured in the process of making the boiler. He thought this caution specially meet at this time, when so much steel rejected for the United States naval cruisers on account of the high standard demanded for these cruisers was now floating around in the market. Mr. Kent thought it a settled fact that less risk was incurred by the use of steel than by the use of iron for boiler purposes. Mr. Wellman disputed the novelty of Mr. Scheffler's construction, since boilers with one sheet at the bottom had been in use in Cleveland for at least eight years. Mr. Davies believed that a self-contained boiler was the best form. He found that the brick-work cost more than the boilers to set up and keep in repair. In his practice, he had never found the seams to give out, but the sheets annexed to them. A new boiler, only six months in use, that blew up owing to excessive pressure, coming under his observation recently, had the sheets destroyed, but the rivets intact. Mr. Barnes considered riveted seams made an amply good and strong job. A riveted seam can be relied upon as a certain thing, while a welded seam necessarily involves uncertainty. Mr. Davis indorsed the idea of riveting, on account of the possibility by proper inspection of being sure of the job. Professor Denton cited the practice of the Pintsch Lighting Company, which imports tanks of 36 inches diameter welded up (not riveted), which tanks withstand a working pressure of 200 pounds. These tanks, adding import duty, are apparently cheaper than suitable tanks procured in this country.

Mr. Thomas D. West followed with a paper on

SOUND CASTINGS,

in which he dwelt upon the difficulties and the methods by which they are overcome in a few typical cases which he illustrated.

The discussion following this paper was somewhat rambling, and, while a number of hypothetical questions were put to Mr. West, which threw some doubt on the exact value of his propositions, which hypothetical questions he was unable to answer satisfactorily, it was none the less commented on with gratification that there are foundrymen who are trying to make not only what will sell, but what is really good. By special permission, Mr. Cope Whitehouse had fifteen minutes accorded him to give his version of Lake Moeris and the Pyramids, but the late hour reduced these fifteen to three minutes, so that there was no real hearing. Since, however, the members can read Mr. Whitehouse's views on this subject in *Van Nostrand's Engineering Magazine* of November, 1884, it is not a matter of much moment. In the evening, the members visited the Exhibition of the American Institute.

On Friday morning, the members of the society were tendered an excursion to Paterson, New Jersey, a special train having been provided by the courtesy of the Delaware, Lackawanna & Western Railroad. The points of interest visited were the Rolling-Mill, the Rogers and Grant and Cooke Locomotive Works, and a silk mill. Returning in the afternoon, the society inspected the laboratories and workshops of the Stevens Institute of Technology at Hoboken.

The first paper of

THE FOURTH SESSION,

on Friday evening, was that of Mr. F. W. Halsey on

A NEW ROCK DRILL,

describing the principles of the drills recently brought out by the Rand Drill Company of this city. Mr. Halsey's reading of the paper was very clear and his description thorough. It did not, however, elicit any discussion. We shall print it in full in a future issue.

Mr. C. J. H. Woodbury, of Boston, read a paper on Measurements of Friction, and Prof. R. H. Thurston, of the Stevens Institute of Technology, followed it with an ably presented summary of a paper on the Sliding Friction of Rotation. Both were discussed together by Messrs. Towne, Schumer, Holloway, Kent, Odell, and Emery; Dr. Arvin, chemist of the Standard Oil Company, a guest, speaking by invitation at length on the experiments made under his supervision on the applicability of different mineral lubricants to a variety of purposes. A series of photographs was then exhibited by a projection lantern, showing the mammoth bed of the Indian Ridge Colliery of the Philadelphia & Reading Coal and Iron Company, as illuminated and photographed by the electric light, with other views of mine interiors and explanation of the appliances used.

ELECTRIC TRANSMISSION OF POWER IN MINES.*

By Prof. W. S. Schulz.

The author deduces from the executed electrical transmissions of power tabulated below that the maximum electrical efficiency of the receiving dynamo practically attainable is 50 per cent of the transmitting motor:

Name of Pit.	Power of motor.	Machine driven.	Length of lead.	Efficiency.		
				Electrical.	Mechanical.	Total.
	H. P.		Meters.	P.c.	P.c.	P.c.
La Peronnière, near Rive-de-Gier	37·1	Hauling machine	1,500	50·0	37·0	30
Thibaut, near St. Etienne	5·0	"	250	45·0	38·0	25
Blanzy	17·0	"	634	....	51·0?	30
Zaukeroda	14·7	Loco.	893	46·6?	37·8?	30
Zaukeroda	5·0	Fan	780	50·0	26·0?	....
St. Claude, near Blanzy	8-10	"	900	....	....	....

On this basis, he compares the cost of electrical transmission of power with the actual cost of transmission by compressed air and water applied to rock-drills and coal-getting machines, locomotives, cable and rope-hauling machines, and ventilators, and finds the former more costly than other methods, except where air is compressed by steam power without being cooled, and in the case of locomotives, for haulage on levels. The comparative cost of such haulage in actual operation is given in the table:

UNDERGROUND HAULAGE BY LOCOMOTIVES.

	Steam.		Compressed air.		Electricity.
	Dornan pit.	Cesson pit.	Petan's system.	Mékarski's system.	Zaukeroda pit.
Cost of plant	Marks. 32,000	Marks. 32,000	Marks. 13,000	Marks. 20.000	Marks. 16,000
Interest, etc., per ton-km	d. 0·264	d. 0·091	d. 0·490	d. 0·502	d. 0·276
Cost of haulage " "	0·372	0·316	0·736	0·841	0 680
Total cost " "	0·636	0·407	1·226	1·343	0·956
Daily work	Ton-kms. 488	Ton-kms. 1,421	Ton-kms. 106	Ton-kms. 159	Ton-kms. 235
Length of line	Meters. 2,320	Meters. 4,627	Meters. 620	Meters. 620	Meters. 620
Speed "	2·3	3·3	1·5	1·5	2·6
Weight of engine	Kilogms. 4,400	Kilogms. 8,000	Kilogms. 2,700	Kilogms. 2,300	Kilogms. 1,600
Hight " "	Meters. 1·92	Meters. 2·1	Meters.	Meters. 1·55	Meters. 1·5
Width " "	1·30	1·6	....	1·10	0·8

For the separate ventilation of a lateral drift of the Zaukeroda mine,† a 40-inch Schiele fan is used, driven by a Siemens dynamo actuated by a Dolgorouki steam-engine; the cost per 1000 cubic meters is 0·27d., which is cheaper than transmission by compressed air only where a special compressing plant for the small fan has to be put down. The author concludes that there is no field for electrical transmission in mining, special cases excepted, except for hauling on levels by locomotives, which could advantageously replace rope or cable haulage.

COAL MINE EXPLOSIONS.—An explosion occurred November 9th in the Tredegar Coal and Iron Company's colliery at Hockin, near the town of Tredegar, England, by which fifteen lives were lost.

Fire-damp caused an explosion in a colliery at Wasmes, in Belgium, on the same day, by which twenty persons were killed.

THE VELOCITY OF EXPLOSIVES IN GASES.—A paper was read at Montreal on the Velocity of Explosions in Gases, by H. B. Dixon, M.A. MM. Berthelot and Vieille have shown that, in oxygen and hydrogen and several other mixtures of gases, the "explosive wave" is propagated at a velocity closely approximating to the mean velocity of translation of the gaseous products of combustion calculated on the assumption that all the heat of the reaction is contained for the moment in the products formed. The mean of a number of determinations with electrolytic gas gave a velocity of 2810 meters a second, the calculated mean velocity of the steam molecule formed being 2831 meters a second. These experimenters found that carbonic oxide, exploded either with oxygen or nitrous oxide, did not agree with the rule. The author has shown that steam is necessary for the burning of carbonic oxide, both with oxygen and nitrous oxide, and that, as the proportion of steam is increased, the rate of inflammation is also increased. Experiments made in a lead tube 55 meters long and 13 millimeters in diameter entirely confirmed MM. Berthelot and Vieille's experiments with hydrogen and oxygen. The rate of the "explosive wave" was found to be 2817 meters a second as the mean of several closely concordant experiments at 10 degrees C. With carbonic oxide and hydrogen nearly dry, the explosive wave was not established until the flame had traversed a distance of 700 millimeters from the firing point; the explosive wave was found to have a velocity rather over 1500 meters a second. After the explosion, a fine layer of carbon was found to cover the inside of the explosion tube, showing that, at the enormous temperature of the explosive wave, carbonic oxide is decomposed into its constituents.

* Proceedings Institute Civil Engineers.
† Minutes of Proceedings Inst. C.E., vol. lxxiii., p. 474.

THE DISTRIBUTION OF SAN JUAN COUNTY ORES.—VI.

By Theodore B. Comstock.

THE MINERALOGY OF THE SIX RADIAL ZONES.

5. *The Argentiferous Galena (Glacier Peak) Zone.*—In this belt are included those primary veins that trend between S. 66 degrees W. and S. 87 degrees W., the central parent fissure being nearly on the course of S. 76 degrees 30 minutes W., from Red Peak. (The limits of the Glacier Peak area, as roughly announced in No. I. of this series, were intended to be defined by the bearings S. 68 degrees W.–S. 85 degrees W. from Red Peak; but I have since been led to widen the belt upon each side, by subtracting a little from zones 4 and 6, leaving the axis as at first. As the boundaries are at best somewhat arbitrary, this change will have no effect on my remarks already made, except to make the width of this zone, at the 10-mile circle, nearly four miles, instead of three, as given on page 208 of the current volume of the ENGINEERING AND MINING JOURNAL, and to reduce the width of zone No. 6 from 17 miles, as there stated, to about 16 miles at the 10-mile circle.) It will be remembered that this bearing is closely in accord with the trend of the axis continued of the bismuth zone (No. 2), N. 79 degrees 30 minutes E. That zone is also of nearly the same width as the ore we are now considering. Other similarities will be apparent as we proceed; but the difference in the character of the ore is very considerable in certain respects.

The vertical free-gold veins of the axis traverse the highest ridges. Starting from Red Peak, the line runs along a spur of Red Mountain below the Congress mine (southward), crossing the cañon of Mineral Creek below the deserted village of Congress; thence following the divide between Porphyry and Mill creeks, running across the head of Bridal Vail Basin and on the divide between Turkey Creek and Bear Creek; thence along the summit of Silver Mountain, back of Ophir, crossing the cañon of the South Fork of San Miguel River about halfway between Ophir and Ames. It then continues on the same course across Howard's Fork, ascending a prominent spur of Mount Wilson leading up to Glacier Peak, the highest point on that eminence. The same line prolonged passes westward near the ridge that forms the water-shed between the courses of the San Miguel and Dolores rivers, being also the boundary line between the two counties of the same name.

In this district, the gold veins are almost invariably exclusively auriferous, and the fissures that lie on each side of the axis are filled with argentiferous ores, of as uniform character throughout as can be found in any portion of the territory we are reviewing. This section is only beginning to receive the marked attention its resources merit, and heretofore it has been overlooked as a gold-field on account of its recognized importance as a silver-bearing area. The Golden Group mill on Bear Creek, the Gold King mill at the head of a branch of Turkey Creek (Gold King Basin), and the little five-stamp mill of Lane & Goebel, at Ophir, though quite successful, have not been supplemented as yet by any other similar enterprises, except the Turkey Creek mill, which is not in complete running order.

This belt is even more like the galena-gray copper zone than the bismuth zone in its mineralogy, and there is now every reason to believe that these two districts will prove to be the great free-gold producers of this region. The exact relations of the rich Summit District (Rio Grande County) to these belts is not clear as yet, owing to our imperfect knowledge of the intervening country; but there is a marked difference in structure, and the Summit District is probably not synchronous in origin. (See the very able illustrated paper upon the geology of the Summit goldfields, written by R. C. Hills, and read before the Colorado Scientific Society in March, 1883. An abstract of the same, by S. F. Emmons, with map and section, was also published on page 332, Vol. XXXV., of this JOURNAL, June 9th, 1883). From present information, I would regard the Summit District as of earlier date.

Although freibergite is probably the characteristic silver-bearing mineral of this zone, it is very rare to find it unconnected with galena, with which it is usually so intimately blended as to be itself incapable of detection by the eye alone. Most of the ores would be regarded by observers as very pure galenas, and there is nothing in their physical characters from which one could estimate the silver contents. In some veins, however, as the Nevada Tidal Wave and Santa Cruz near Ophir, the San Juan near Trout Lake, and a few others, there is a considerable amount of freibergite or a similar mineral in separate streaks. This is, as near as I can detect, invariably the same mineral, and somewhat different from the typical freibergite. In some respects, this mineral is similar to the ferruginous freibergite of Sultan Mountain, but in other particulars it resembles more the typical berthierite. Unfortunately, I have never run across any crystalline masses. Copper is apparently less abundant than iron in all cases. It may make the matter more clear to state that the names "gray copper," "bismuth glance," "native silver," and "hematite" are all popularly applied to this ore, according to its mode of occurrence in the gangue, in specks, flakes, or streaks.

Not only is the silver excluded from the gold veins, but the argentiferous ores also rarely, if ever, contain gold in workable amount. The Nellie & Nettie, Golden Thread, and other claims on Bear Creek, running through the divide to Prospect Creek; the Golden King and its compeers; the Globe, Atlas, Suffolk, Osceola, and neighboring locations near Ophir, and numerous less known properties, are all characterized by a brittle brownish quartz, carrying free gold, both in fair-sized nuggets and as invisible specks. The Lewis, in Bridal Vail Basin; the Mohawk, Summit, Crown Jewel, Grand Prize, Geneva, and many other mines on Silver Mountain, have only the rich galena above noticed, with a copious accompaniment of soft ocherous material of dark red or yellowish-brown tints. In the Pitkin, Santa Cruz, etc., much undecomposed pyrite also occurs. The Caribou and Silver Bell, on the ridge south of Ophir, resemble the ocherous galena veins in part, but they also show other secondary effects in the presence of copper carbonates, usually not readily separable from the galena.

Relics of hot springs are abundant in this zone. The head of Prospect Creek is strewn with mounds that mark the positions of ancient bowls of thermal water, and much of the irregular topography of the mesa country, between the two main forks of the San Miguel River, is due to the same causes. In the south fork, above Ophir, several large cold pools, with high rims of siliceous iron oxide, give even more positive evidence of such a history. The name, Iron Springs District, given to this local mining subdivision, is indicative of the same thing. Swamp Cañon is so called because of the very sluggish drainage, due to these remnants of former hot springs that there abound. I am not aware, however, that any exploitations have been made (except for surface iron ores as fluxes) in such localities. The worked veins do not outcrop very near these springs or mounds. The Deadwood mine, however, between the Nevada and Ophir, shows some of the cavernous features of the superficial portions of such water conduits, and there is at least a suspicion of such a structure in parts of the Silver Bell vein. As a rule, however, the mines are worked at greater altitudes than the old hot springs, which were chiefly down in the valleys as they now exist.

Bismuth compounds have been reported from this zone, but, not to my knowledge, by any one who has been competent to apply the blowpipe test. Although I have examined many ores, including the Santa Cruz and others, that are said to yield this metal, it has not yet manifested itself to me in the delicate test with sulphur and potassium iodide on charcoal.

Cerargyrite (horn-silver, or silver chloride) is not wholly absent, but it is by no means as abundant as many believe. Once in a while, small grains of it may be detected in the brown iron ore that accompanies the argentiferous galenas; but this only in special localities where the latter ores are very rich in silver, and then in very small proportions. Mr. H. C. Corbin, of Telluride, who is one of the best-informed mineralogists in this region, has kindly shown me about 300 pounds of this mineral, all of which was taken this season from a pocket in a mine a few miles from that town. I can not now say positively in which zone it was discovered, but am inclined to think it was near the edge of the belt we are now considering.

Acanthite (orthorhombic silver sulphide) may form a portion of the so-called "black sulphurets" that occur in some veins. Much of the material to which this term is applied, is, however, any thing but this mineral. The names "chloride" and "sulphuret," intended for the silver compounds, are most wofully misused in most instances. In Ice Lake Basin, for instance (Zone No. 4), little patches of free sulphur, resulting from decomposition, are often called chlorides; while in the argentiferous galena zone, the same term is adopted, at times, as a cognomen for the iron oxide.

The galena is usually found in streaks, from two to three or four inches in width, more or less imbedded in the ocherous material, with a prominent "gouge" or selvage. This last often carries a few ounces of silver, but not enough to make it of commercial importance. The ocherous streak commonly holds from 30 ounces upward of silver to the ton, and the galena of this district rarely yields less than from 50 to 60 ounces, and often from 100 to 150 ounces, or even more.

One striking peculiarity of this zone is the almost entire absence of zinc. A better quality of smelting ore is not to be had, outside of the lead-carbonate districts, than is produced by the galena veins of this belt. Most of the ore-bodies are narrow, and many of them are in places difficult of access; but all such hinderances are more than balanced by the quality of the mineral, which ordinarily brings from $2 to $3 a ton more in the market than similar grades of the more refractory kinds.

As might be inferred from the nature of the axial veins, wherever any of them are crossed by streams, cañons have been formed. This feature is especially noticeable in zones 2, 3, and 5, which are the principal gold belts. Above Gladstone and between Eureka and Animas Forks in the bismuth zone; at the crossing of Cement Creek and of the Animas River on the axis of the galena-gray copper zone; and where the argentiferous galena zonal axis is cut by the South Fork of the San Miguel, as well as at other points within these districts, the stream valleys are much constricted, with precipitous walls. In zones 1, 4, and 6, the same result is evident in places; but the general course of each axis throughout its length is parallel with the main streams of the district. This difference in the topography of the zones is not accidental, but is due to clearly defined causes, which have a very important relation to the history and economic value of the deposits.

Much of this district is covered with soil and with grass and timber growth, making it not always easy to detect the positions of veins below the timber-line. There is, however, very good reason to expect important future discoveries in new localities. The head of Prospect Creek and the smaller tributaries of Turkey Creek are particularly favorable localities for prospecting, if sufficient attention is given to the matter; but it will be much more difficult to find the exposures there than in the ridges that rise above the timber. At present, the areas of ancient hot springs have not yielded any mineral products that give a clue to the deep-seated contents of the veins in this zone, and there is probably no district, except perhaps Zone No. 1, that has been less explored in depth. So far as it is now safe to generalize, there seems some fair ground for the belief that the true silver minerals lie deeper than the galenas that now characterize the belt.

Much more investigation must be given to these veins before we can read their whole history satisfactorily. There are some facts that seem to point toward an origin not unlike that of the Leadville deposits, of which Mr. Emmons remarks (*loc. cit. ante*, closing paragraph. See also Mr. Emmons's contributions to the Tenth Census Report on Precious Metals, and his detailed papers in the publications of the United States Geological Survey, where he has discussed these subjects in his usually thorough manner, giving a formidable array of facts in support of his conclusions), that they "are simply the alteration, silicification, and mineralization of the country-rock along certain planes, which, for some reason or other, offered exceptionally easy access to percolating mineral solutions." Or, more in accordance with the facts, some of the veins in this zone are of such a character that the possibility of this genesis is less disputable than in most cases. Mr. Emmons has certainly had opportunities for studying the Leadville deposits with far greater detail and by more refined methods than I have yet been able to apply in this region, and it would be presumptuous for me to criticise his theories minutely. But I am not yet prepared to adopt his view expressed in the same sentence, that it is "reasonably certain that a very large proportion of the so-called fissure-veins in the Rocky Mountain region, notably those in Colorado and Montana, . . . are not the filling-in of pre-

existing cavities in the rock, as is generally supposed to be the characteristic of a true fissure-vein."

The gangue of this district is chiefly quartz. In some veins, it is much less abundant than the ores; but in others, there is an abundance of this mineral, through which galena, etc., are disseminated. Some of the best concentrating ores occur in this zone. Occasionally, as at the Summit, Grand View, and other mines, the abundant iron oxide carries a notable amount of silver, and rarely, a fair percentage of lead, but these instances are rather exceptional.

No special advice can be given as to choice of locations, other than the common hint to choose ground that is well exposed to the sun and free from liability to snow-slides. These precautions are more necessary here, owing to the courses of the axis and the major ridges. Aside from this, it will be well to keep in mind the remarks previously made regarding the advisability of thorough exploration of the mounds and timbered areas in certain tracts. Beyond the secondary focus of eruption, in this as in some other zones, there are important modifications due to the occurrence of sedimentary terranes at or near the surface; hence, the typical features can not be relied upon outside of a restricted area, say ten or twelve miles from Red Peak. In this case, the continuation of the axis leads into the district of contact-veins in the neighborhood of Rico. Further study is necessary in order to determine the true relations or the degree of connection between the two districts. I am inclined to believe that the transition from fissure to contact structure is gradual and almost imperceptible, and that the Dolores County region is closely connected with this zone in its history.

THE HUSBAND OSCILLATING CYLINDER STAMP IN CORNWALL.

Mr. W. Derry, manager of the Owen Vean and Tregurtha Downs mines, gave the results of the work of the Husband oscillating cylinder stamp at his mines in a paper read before the Mining Institute of Cornwall:

The first two heads were started on June 7th, and the remaining two on June 21st last. From causes wholly unconnected with themselves, the stamps had not been constantly at work since their erection. He was safe, however, in saying that three months was considerably within the actual time of constant running. He would take the performance from September 1st to September 28th as fairly performing their duty, including stoppages, to be 2000 tons 15 cwts., at the rate of 86 tons a day of twenty-four hours. The lode-stuff stamped was principally chloride, of probably about the average hardness of rock stamped in Cornwall. The maximum speed was 125, and the average barely (as far as he could judge) 122 blows a minute. The copper grates were very fine, 36 hole, three grates of equal size to each copper, and each having a perforated area of 21½ inches square. The stone was sent into the passes fully 30 per cent larger in size than the standard adopted in the county for the supply of stamps of the old sort. The quantity of grate-water was very small, compared with what he was informed had been supplied to this kind of stamps elsewhere, and herein lay probably to a great extent the secret of the extra work they had performed there. Soon after starting, the tin-dresser expressed the opinion that the large quantity of water impeded the exit of the stamped stuff through the grates, and by lessening the water very considerably, they wonderfully increased the duty. He considered that a most important point, and persons adopting those stamps would do well to bear that in mind. The quantity of water used must doubtless vary in different mines according to the character of the stuff and the grates used. The materials worn out in the reduction of the 2000 tons 15 cwts. of tin-stone and their cost amounted to a total cost of £18 5s. 6d., or barely 2¼d. per ton of stuff stamped. He might explain that 20 cwts. to the ton was the standard of results obtained in the trial reported in Mr. Loam's paper. On October 16th, he instituted another sever a wenty-four hours' trial, with a result of 86 tons 16 cwts., or 7 tons less than in the former trial. This falling off he accounted for by the grates being nearly all new and also from the heads and dies being worn much below an average condition. This he regarded as a trial of the stamps under disadvantageous circumstances. The question of coal consumption was not accurately determined, the boilers not being in proper order. He thought that 3½ tons of coal a day would be found about the quantity consumed. Next came the question of durability, and the maintenance of the various parts other than those before referred to. An outlay of £39 3s. 9d. would practically provide a new one-head battery; or, in other words, when the four heads were completely worn out, they might be replaced by an expenditure of £156 5s. The period when this would become necessary was evidently remote, as by merely re-planing the guides, re-boring the cylinders, and supplying new piston rings at comparatively little cost, the whole would be virtually renewed. On September 29th, the stamps were taken abroad and carefully examined, and the only wear that could be detected was the mere removal of the burr or traces of the fitting-shop. An iron wire 5½ inches long would hang suspended across the middle of the pneumatic cylinders, that being their exact diameter at the outset. The fineness of the copper grates used indicated the nature of their tin, which was exceptionally fine in the grain. They stamped directly into the round buddles, and the separation was excellent; the tails of the first or stamps buddles, unworthy of further treatment, were sent direct to the barrows. These were authentic facts of a conclusive nature, requiring no further comment from him. He might say, however, in conclusion, that it would afford him the greatest possible pleasure to receive the visits of members or others desirous of seeing the stamps at work, and to answer inquiries on the subject.

In the discussion that followed the reading of the paper, the President, Mr. R. J. Frecheville, remarked that there could be no doubt that the reduction of tin-stuff to the proper size for dressing purposes was one of the greatest importance to the mining industry of Cornwall. Of late years, there had been a great many improvements in many other departments of mining, but there had been very little improvement in regard to stamping machinery. The Americans were far ahead of them in this respect, but he thought Mr. Husband had advanced beyond the American invention with such an enormous bound that the whole question of stamping in Cornwall would have to be reconsidered. Mr. Husband's stamps worked as smoothly as possible, and he really thought in a county like Cornwall that they would be the stamps of the future.

COPPER AND COPPER ORES.

Written for the Engineering and Mining Journal.

THE CAPE COPPER MINES.

A steady producer of copper during the past twenty years has been th Cape Copper mines, on the west coast of Africa. They have never shocke the market by threatening an enormous output, nor ever disturbed it b any sudden fluctuation; but have, from year to year, poured about 5000 tons of copper into Swansea, and as regularly dropped large dividends into the pockets of their owners.

The report of 1882–83 shows the output to have been:

Ookiep mine, 15,827 tons of 28⅝ per cent concentrate =	4,526 tons.
Specktakel mine, 1728 tons of 37·56 per cent concentrate =	649 "
	5,175 tons fine copper,

which sold, at an average of 13s. 2d. per unit, for £352,850 18s. 4d.

The report for 1883–84 shows the yield of the

Ookiep mine as 15,588 tons, 29·23 per cent ..... =	4,555 tons.
Specktakel mine as 1800 tons, 39·16 per cent ... =	668 "
	5,223 tons fine copper.

which sold, at an average of 11s. 11d. per unit, for £307,911 19s.

The total costs for 1882–83 were.....	£207,386	6 7
The total costs* for 1883–84 were.....	206,777	7 11
The net profits for 1882–83 were.....	£145,464	11 9
The net profits for 1883–84 were.....	101,134	11 1
The reserves in 1883 in the Ookiep mine were.....	41,223 tons.	
The reserves in 1884 in the Ookiep mine were.....	42,113 "	

The uniformity in cost and production is remarkable. Unfortunately, the like uniformity did not extend to the profits and to the price realized from the ore.

The three productive mines of the company are at a distance of about 90 miles from Port Nolloth, an open roadstead in Little Namaqualand, about 500 miles north of Cape Town. The Springbok and Ookiep mines are about 20 miles to the east (?) of the Spectakel mine.

Copper was first mined about 1847 from this region by Messrs. King & Son, of Cape Town. They extracted profitably from that date until 1863 the oxidized and surface ores of the Springbok, and the purple ores of the Spectakel, and carted the product to Hondiklip Bay. In 1863, the mines passed into the possession of the present public company. Shortly afterward, the Ookiep mine tramway was built from Port Nolloth to the Ookiep, and operations were conducted on a more systematic as well as more extensive plan than previously.

The Springbok was once the most famous and productive of the group, but has long been unprofitable and almost barren. As, however, more than once one and another of these mines has been virtually abandoned as worked out, and has again sprung into vigorous life, and as, from week to week, owing to the irregular distribution of the ore, the face of the levels in the mines, except in the Ookiep, alternate from poverty to richness, the company perseveres in hoping against hope that the Springbok may yet recover its lost character. Work and explorations have been conducted to 40 fathoms from surface, where small and intermittent veins of purple ore are met with, but the wealth of the mine lay about the 20-fathom level in oxidized ores, chiefly silicates.

The next in age is the Spectakel mine, 20 miles east (?) from the former, and about 40 miles off the Ookiep and Port Nolloth tramway, which the mine road joins at Cananou's. The Specktakel was formerly worked as an open quarry, and now presents to the heavens a huge pit about 300 feet long by 100 and 150 feet wide and 200 feet deep, out of which immense quantities first of oxidized copper ore, and then of purple sulphurets, were taken from a gangue of decomposed gneiss. Below the 38-fathom level, the ore passes eastward, and is confined for 10 fathoms farther between two wide fluccan courses, which are about 40 feet apart. But below the 48-fathom level, the ore escapes from the fluccans, and, with no limits that can with any show of plausibility be called walls, it has been followed and worked on to a depth of 86 fathoms, although, below the 75-fathom, the ground is poor. In 1878, the mine was on the point of being abandoned, when, after drifting for 30 or 40 feet, through barren gneiss, an ore mass was struck of which there were no indications at surface, and toward which the underground explorer was led by the most slender clue. The discovery gave the mine a new lease of life; but it would appear from the reports to be again ebbing fast.

The main support of the company is now the Ookiep mine, worked on a body of ore neglected before the acquisition of the property. It was concealed under a few feet of barren rock, and when opened was found, unlike the two other mines, not to yield any notable quantity of oxides. Erubescite was the prevailing ore, mixed from the surface with a small percentage of copper pyrites, which latter has gradually increased in proportion, until now the yield is about half purple and half yellow sulphuret.

As in the other mines, the copper occurs in partially altered gneiss. It prefers the quartz, which, as in gneiss rocks, is often separated from the other constituents, though much of it is found in feldspar layers. The ore was confined between two fluccan courses, 300 feet apart at the surface; but they approached each other as depth was attained, so that, on the 40-fathom level, the ore escaped from between these and expanded to the east. From the reports, we gather that the lowest level in the Ookiep mine is the 105 fathom; that the longest level is the 60 fathom, namely, about 600 feet; and that the bottom of the mine is for the time being poor, and, as good ore has not elsewhere been found in the district at a greater depth, the impoverishment may prove permanent.

The reports give some details of work at six other points, where the indications gave promise, as yet unfulfilled, of mines, and refer to the inducements held out to explorers to find good prospects, and the many futile attempts to which these open promising locations thus acquired have led. Vigorous exploration has for many years been conducted over the whole of Little Nemaqua Land, about 40,000 square miles; and far north of the Orange River, in Great Namaqua Land and Damar Land, copper is known to exist, and may be one of the possible products that gives value to the latter desert country in the eyes of Prince Bismarck.

* Reports of Cape Copper Mining Company (Limited) for 1882-83 and 1883-84 Received through the favor of Messrs. Richardson & Co., Swansea.

Germans, notably a Mr. Peter Scheinweiler, are now working copper mines on a limited scale within the German protectorate.

The ore is all shipped as a concentrate. The scarcity of fuel and the cost of imported coal and coke rendered unprofitable the attempts at smelting heretofore made. But transport is now cheaper, and the water-jacket has been introduced since the date of the last campaign, between 1870 and 1874. Then coke had to be hauled for fifty miles from the end of the tramway, and cost at the mine $45. Brick furnaces of a capacity of 30 tons were used, whose life did not exceed ten days, and whose renewal cost $350. The ore treated was a mixture of siliceous silicates and basic sulphurets (copper pyrites in a gangue of magnetite), giving a furnace mixture of 10 per cent, yielding a 55 per cent and 60 per cent regulus, producing a clear slag, and consuming in its fusion 17 per cent of coke. It would seem that, with such an excellent mixture and under the improved conditions of to-day, the company might renew the experiment of smelting with fair prospect of success.

At the Specktakel mine, water is so scarce that only twelve old-fashioned English hutches and ore-buddles can be used, and consequently most of the ore is merely hand-picked. At the Ookiep, the ore, as it comes from the mine, is screened through a half-inch riddle. What passes is hand-jigged through a coarse screen. The coarse is hand-sorted. The pieces of from 40 to 45 per cent go to the pile, and the second quality is crushed and screened through a quarter-inch mesh trommel, and the slimes separated in a knife-buddle, a helix that revolves against a current of water. The grains are concentrated in German jigs. The product of the first screen goes to the pile, that of the second is reconcentrated. The slimes are washed in English buddles. The cost of transport necessitates carrying the copper to a high degree of concentration, thus involving a serious loss in the tailings. Enormous quantities of from three to four per cent tailings, of from 10 to 12 per cent slimes, and 12 per cent ragging, in which the copper is associated with pure magnetite, are piled away for future treatment. The average of the mine is probably about 10 per cent, of which about 8 per cent is recovered. Two hundred tons or so are raised daily, and yield 16 tons of concentrate.

Negro labor is plentiful and cheap; water is scarce and fuel dear; and these conditions therefore have determined the method that, though cumbersome, has proved most profitable in recovering the greatest value, if not the most copper, from the ore. Most of the work, both in and out of the mine, is done by blacks—Hottentots and Damaras (a race allied to the Zulus). They are paid for underground work about 85 cents, and on the dressing-floors from 50 cents to 85 cents a day.

The concentrate is bagged and conveyed to Port Nolloth on a mule tramway. The road descends about 3000 feet in the first 45 miles, and thence from Cananous to the port is almost level. Formerly, locomotives were used, but it has been found most economical to use animal power throughout. The tables published by the traffic department are interesting and show on an average:

Up Traffic.	Lbs.	Lbs.
On the level, 13 animals draw 12 trucks, weight, gross,	20,036,	net 9701
On the hill, 15 animals draw 8 trucks, weight, gross,	11,663,	net 5187
Down Traffic.	Lbs.	Lbs.
On the level, 13 animals draw 12 trucks, weight, gross,	37,900,	net 27,562
On the hill, 15 animals draw 8 trucks, weight, gross,	21,972,	net 15,596

At Port Nolloth, the ore is transferred by lighter and loaded in bulk, generally on sailing ships, for England, where of late years the company has smelted a large part of its own ore, having found it more advantageous so to do than to offer it for public competition.

For much of the above information I am indebted to Mr. Joseph Ninnis, who was for six years in the company's employ at the Cape.

J. D., JR.

THE GOLD VEINS OF SILVER MOUNTAIN, OPHIR, SAN MIGUEL COUNTY, COLO.

Some years ago, I drew the attention of the readers of the ENGINEERING AND MINING JOURNAL to the mineral resources of the district of which Ophir is the center. At that time, the veins were all comparatively undeveloped, but promised well. Since then, Ophir has become one of the principal points from which is drawn the ore shipped on the cars at Silverton. The shipments from the silver mines have steadily increased year by year, and, while the ore has increased in quantity, it has not deteriorated in quality.

The silver lodes of this district are receiving the praise they deserve. The gold lodes, promising in the near future to be in every way as important, if not more important, are, however, rarely mentioned. This, no doubt, is due to the fact that, being owned chiefly by prospectors unable to put up stamp-mills to work the ore, no special attention is drawn to them.

The first gold vein discovered in this district was the Osceola. Attention was drawn to it by the strike on the surface of an exceedingly rich pocket of free gold. Other gold lodes were also located during that year; that is, in 1877. Among these locations were the Globe, Atlas, Suffolk, Powhatan, Clipper, and Exodus. In the following year, the Gold King was discovered. On the surface of this vein, a pocket of free gold ore that netted about five thousand dollars was opened up. This strike gave the claim a great name among prospectors, and gold veins were prospected for and located; among them being the Greenback, Gold Chief, Chancellor, what is now known as the Golden Eagle, and Little Eva and its extension, now known as the Bonita. During the year 1879, a small pocket of ore running fully 75 per cent gold was found on the Red Jacket, and for a short time stirred up prospectors. Since that time, practically no new discoveries of gold lodes have been made on Silver Mountain until the present year.

During 1878, two arrastras were built to work the gold ore of Silver Mountain. One of them had two tubs, and the other one. During the winter of 1878, an arrastra with four tubs was built at Rock Point, a few miles below Ophir. The two arrastras at Ophir worked some ore during 1878 and 1879. The arrastra at Rock Point worked quite steadily during the summer of 1879, but then shut down. They were financial failures, partly on account of the unskillfulness of those working them. I have myself panned out of dirt below the tubs from 25 to 50 cents of amalgam to the pan, and this was after the best part of the dirt had been removed.

During 1881, a mill was started to treat the Gold King ore. After working for a while with ten stamps, the number of stamps was increased to twenty. Of the success of this mill, nothing is known, the owners not being willing to make any statements. The general opinion, however, is, that the Gold King is a big success. The owners certainly are working the property steadily, and they are credited with shrewdness enough not to throw good money after bad.

During 1882, the Big San Juan Mining and Milling Company brought in a smelter and a stamp-mill, which are yet lying idle in the town. The smelter was a bad investment from the start, but the stamp-mill might have been made a success. Started as a custom mill, the stamp-mill would have paid, and long ere this the company could have bought some gold property to furnish a steady supply of ore for its mill. But that company is another illustration of the need of horse sense and experience to make a success of mining.

The present year Goebel & Lane obtained a two-year lease on the Osceola, and have put up a five-stamp mill to treat the ore. Mr. Goebel is the owner of the principal store in town, and is noted for the caution he uses in his enterprises. Mr. Lane had been superintendent of the Osceola while that mine was worked during 1881. He, of course, had every opportunity of knowing what ore the mine could furnish. Under such circumstances, their enterprise was likely to be successful, and it certainly is a success. The Osceola ore treated pays well, and there is no question but that the lease will pay a good many hundred per cent on the investment made.

Besides treating Osceola ore, the mill has treated ore from a few other mines, including about a hundred tons from the Suffolk lode that averages a little more than forty dollars to the ton.

I think there is no doubt but that the coming year the number of stamps will be increased and sampling-works will be added, so that small lots of gold ore can be bought. With these additions, there is little question but that the amount of ore worked will be considerably increased; for then mine-owners will be able to make test runs at a comparatively small expense.

OPHIR.

THE BROOKE IRON HOT-BLAST STOVE.

Some time since, Mr. Horace L. Brooke, of the Baltimore Iron Company, Baltimore, addressed the letter reprinted below to the Secretary of the American Iron and Steel Association, describing a new hot-blast stove. At our request, he has sent us a sketch of the stove, reproduced in this issue. It is not drawn to scale. Mr. Brooke says:

There are many furnaces in this country that can not afford the cost of fire-brick stoves, yet feel the necessity of a better one than they have, and to all such I can confidently recommend a stove I have invented, which I think is as near perfect as an iron stove can be, and I believe it will carry an average heat almost, if not quite, equal to the fire-brick stove. The stove is divided into three sections, the cold section, the middle section, and the hot section, the sections being separated by cross-walls. Each section contains three or more lines of bed-pipe, each separated by a space to allow for expansion. All the bed-pipes rest on solid brick foundations, and have no arches under them to burn out and cause the ruin of the bed-pipes. Each bed-pipe has longitudinal divisions, so as to give the blast six passages. The inlets to these six openings are throttled, so as to secure an equal distribution of the blast.

In the cold and middle sections of the stove, are brick arches, which separate the sections from the combustion-chambers; but in the hot section the arches are absent. The gas passes in the combustion-chambers under the cold and middle sections, and then comes up through gas-flues into the hot section. The gas then, after heating the pipes containing the blast, passes to the top of the hot section, and goes into the middle section through openings at the top of the partition-wall. It leaves the middle section and passes into the cold section through openings at the bottom of the partition-wall, and then escapes at openings in the top of this section to the chimney. The blast and the gas travel in opposite directions, the blast entering at the cold section and leaving at the hot section, while the gas enters at the hot section and leaves at the cold section. This gives three times the circulation that any other iron stove gives, consequently less gas is required to do the same work.

When the blast at our furnace is 1050 degrees at the tuyeres, the escaping gas is from 420 to 460 degrees, while the escaping gas from all other iron stoves is from 1200 to 1600 degrees. My stove being divided into three sections and the gas passing the reverse way to the blast, the pipe in that section where the cold blast enters and in which the gas arrives deprived of most of its heat will last a generation, and those in the middle section will last a long time, while those in the hot section will be the first to oxidize. I think my stove is the only iron stove that has any claims to a scientific arrangement for utilizing the heat from the gas and delivering the blast at a temperature nearly equal to that of the metal in the pipe. We have not tested the stove to its capacity by any means, because our furnace has but one stove. We do not go beyond from 1050 to 1100 degrees, but I believe the stove will carry from 1200 to 1300 degrees without injury to the pipes further than oxidation. The stove is simple, costs less to repair, is less liable to get out of order, and the first cost is less than that of any other iron stove.

THE BEST LENGTH FOR STEEL RAILS.—In an article in *Stahl und Eisen* on this subject, the following table of the rails principally used in the various countries stated is given. The author holds the best length for steel rails to be 9 meters (29½ feet); for iron rails, 7 meters (23 feet).

Countries.	Length of rail.	Weight of rail per meter.	Total weight of rail.
	Meters.	Kilograms.	Kilogram.
Germany	6·6, 7·2, 7·5, 9	31·36–36·38	207·300·6
England	6·4, 7·3, 8·5, 9·1	38·7 –43·17	248–389
France	5·5, 8 (usual), 11	30 –38·4	210–414
Belgium	9	25·2 –38	317–342
Holland	7	30·5 –38·6	214–270
Austria	6·5, 7, 8, 9	30·5 –38	214–279
Italy	9, 12	27 –36·5	243–438
Spain	6·2, 8, 9	30 –36	180–324
Russia	7·36, 8·53	26·86	197–228

THE HISTORY AND FUTURE OF BRITISH METAL MINING.—III.*

Dr. Hunt's second book on the Formation of Metalliferous Deposits is divided into four chapters, of which the first relates to the rocks of the mining districts and the distribution of mineral deposits; the second, to the mechanics of mineral lodes, faults, cross-courses, etc.; the third, to the laws relating to mineral deposits; and the fourth, to remarkable phenomena observed in metalliferous ore-deposits. We can not say that Dr. Hunt has arranged his profusion of material in a happy manner, in spite of the fact that the headings of the chapters just quoted would lead the reader to hope for it. The many long quotations from other writers, interesting though they may be to some, detract from the work by forcing the reader to do what the author should have done—digest the mass of material. The system of arranging each subject by districts is also very troublesome. Thus, we are told about the rocks of Cornwall in the first chapter, with naturally frequent reference to the veins; then we have a little more of the veins in the second chapter, many pages farther on, and some special examples in the fourth. We believe that Dr. Hunt would have far better served his readers if he had described the rocks and vein phenomena of Cornwall, Devon, Flintshire, Derbyshire, etc., one by one, or in groups, as they naturally belonged together, and had then followed with a general chapter on the mechanics of mineral lodes and on the laws relating to mineral deposits. As it is, the second book contains a huge mass of material that is very valuable, and yet is not brought into such form as to be readily appreciated. The data relating to Cornwall are particularly full, and are profusely illustrated. They deserve the most careful study, being the record of the most thoroughly explored and, probably, one of the most complicated vein systems we know of. The erratic behavior of the Cornish veins may well shake the faith of the most confirmed believer in the virtues of a "true fissure."

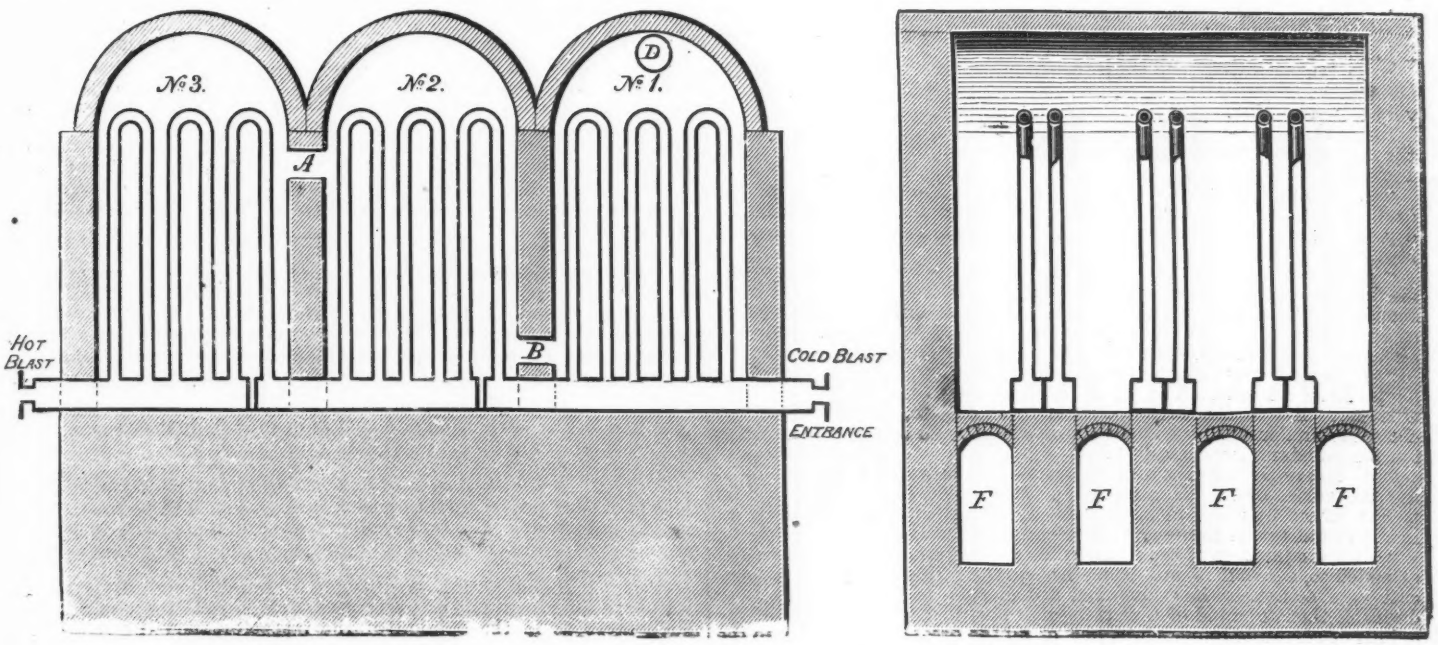
The second chapter gives a very excellent historical review of the theories propounded in regard to the formation of mineral veins. The fourth chapter, treating of remarkable phenomena observed in metalliferous ore-deposits, contains descriptions of the St. Just mines, including the famous Botallack mine working under the ocean, the St. Ives consolidated mines, the Flat Lode of Cam Brea Hill, the Cardaze tin mine, the Gwenna mines, the famous Dalcoath, the Minera mines, the Parys and Mona mines, the Turf copper mines of Merionethshire, the Alston Moor mines, and a number of others. This is followed by a general *résumé* of hypotheses.

Dr. Hunt's third book is entitled "Practical Mining," and begins with a chapter on the discovery of mineral lodes and the opening of mines. It is, in short, largely historical, and only in its last pages refers to drilling as a means of prospecting, no mention whatever being made of the diamond drill, which has become so valuable an adjunct to the work of the prospector in so many mining districts in this country. The second chapter, on the practical operations for the extraction of metalliferous ores, begins with some reference to rock-drilling machinery, quoting the Blanzy experiments with some older forms of compressors, the Sommeiller, the Colladon, and the Darlington being described. Then follows an account of different drill carriages, and of the Darlington drill. Explosives are dismissed in two pages, while a little more attention is given to the methods of arranging holes and firing shots. Dr. Hunt appears to have carefully collected a number of data relating to the comparative speed and cost of working with rock-drills, as compared with hand-drilling. For his description of timbering, he has largely drawn on Prof. W. A. Smyth's lectures. The third chapter, on ventilation and pumping, contains a good many interesting and valuable data, particularly on pumping-engines in Cornwall. In speaking of faults, he refers to Zimmerman's rule and Hoefer's and Schmidt's work. The fourth chapter relates to dressing, and deals almost exclusively with Cornish machinery, and contains little that is new or interesting, except possibly the description of a buddle jigger that has not until now come under our notice. The fifth chapter deals with the discovery and extraction of iron ores from veins and other deposits. Altogether, this book on practical mining, confined as it is almost entirely to the methods in Cornwall, will not prove a mine of wealth to those who are seeking for improved methods. If it is a faithful picture of the state of the art in English metalliferous mines—and we have no reason to doubt that it is—it would do those Cornishmen who have staid at home good to cross the Atlantic to observe what their own friends and relatives have accomplished here, and they could indeed learn much from their rivals in France, Belgium, and Germany.

The fourth book deals with the momentous question of the future prospects of British mining. It gives statistical data concerning the production of copper, tin, and lead in Great Britain, on which no one is so well qualified to speak as Dr. Hunt, who treats of the limits of the metalliferous zone, and the occurrence of ores at great depths or in new districts, with improvements and economy in working British mines, and closes with a chapter giving a review of the whole subject and the conclusions drawn therefrom. Dr. Hunt says:

"The records of the past have been examined with care, for the purpose of ascertaining if it were possible to draw any conclusions from them as to the extent to which the exhaustion of the mineral wealth of the United Kingdom has been carried. Out of this arise the following important considerations as to the future prospects of the great national industry of metalliferous mining:

"(*a.*) During the long period of which we have any account of the mining operations carried forward in these islands, there has been an enormous quantity of the useful metallic minerals obtained from the rocks in which they were in remote geological times deposited.



THE BROOKE IRON HOT-BLAST STOVE.

"(*b.*) Notwithstanding this, it has been proved that the exhaustion of our mineral wealth is now going onward at a rapidly increasing rate.

"(*c.*) The question arises, Is there a legitimate prospect of our being enabled, for any prolonged period, to meet the demands of our metallurgists and manufacturers by the supply of metalliferous minerals obtained from the British mines, or must we be dependent on supplies from other sources?

"As an answer to these inquiries, we venture to place before our readers, for their serious consideration, the following remarks:

"1st. The production of tin ore, from surface deposits, can not much longer be regarded as likely to be of much value. The tin ore to be obtained from our mines is practically inexhaustible, but the additional supply can only be procured by extending the depth of our mines, and consequently by increasing the cost of working them. We have only one decided example of the occurrence of tin at considerable depth below the limits of the copper ore formation. This occurs in Dalcoath mine. The probability is, that similar conditions to those which prevail in this grand old mine will be found to continue in the adjoining mines on the north side of Carn Brae Hill. Possibly also, looking at the undulations of the granite, as shown in the sections of the mines—so far as they have been worked in depth—a stratum of the peculiar character of the deepest beds in Dalcoath may extend round on the southern side of this hill, and give us a renewal of the stanniferous deposits in all those mines.

"2d. The hypotheses which have been put forward in relation especially to copper ore certainly appear to show that, although an uncertain quantity of ore will probably be procurable over several areas, whose productive mines have been worked at depths beyond those at which the mines have been abandoned, the quantity of copper ore to be obtained above 300 fathoms from the surface can not be large. At the same time, it must not be forgotten that the copper-bearing rocks may be found in many places to dip at considerable angles, and produce deposits of copper ore of considerable value in depth. The fact that there are lodes

* BRITISH MINING. A Treatise on the History, Discovery, Practical Development, and Future Prospects of Metalliferous Mines in the United Kingdom. By ROBERT HUNT, F.R.S. London: Crosby, Lockwood & Co. 1884. 8vo, 944 pages, with Index and many Illustrations.

which were at first worked for tin, which have at certain depths passed into copper lodes, and again after being worked for many years changed into tin-producing veins, supports the idea that below the zone now known as a stanniferous one an unexplored stratum bearing copper may be discovered. Until this discovery is made, we must, to a considerable extent, be dependent upon colonial and foreign mines for the metal required to meet the demands of manufacture.

"3d. Lead, zinc, silver, etc., appear to follow the conditions which have been shown to attend the occurrence of copper ore. The ores of these metals may yet be found at greater depths than those at which they are now worked. In general, lead veins have become valueless in the lower strata. It is not impossible that fissures containing lead ore and silver may be found in beds much deeper than those we are now working. It may, however, with a considerable degree of safety, be predicted that the present supply of these metals will continue to require the assistance of imported ores to satisfy the demands of art and industry, until lower productive beds have been discovered.

"4th. Iron ores exist in considerable quantities in some districts, and the requirements of the iron-master may be, for some years, met without difficulty. There are, however, varieties of foreign iron ore which will still be of importance in the production of malleable iron and steel.

"5th. The cost of raising ore by the subterranean labors of our miners has been for many years steadily increasing, and it naturally must continue to increase with the extension of mine workings, unless an improved system of mining be introduced. This applies with equal force to the mining operations for all the metallic ores.

"6th. Without great improvements in the principles of mining, it will not be possible to work, at a profit, many of our deeper and more extensive mines.

"The following matters especially require all the attention of active minds:

"(*a.*) The breaking of ground. The jointed structure of rocks must be carefully studied, that mechanical power may be used and physical force applied to the greatest advantage.

"(*b.*) Explosives should be experimented on with every precaution, and those which give the largest result, with the smallest production of injurious elements, should be adopted.

"(*c.*) Boring machinery must be simplified as much as possible; the application of the power employed to drive them should be the subject of very close attention.

"(*d.*) Ventilation—either natural or artificial—should be established on the most approved principles, and carried out with the utmost economy. Pure air should, *at any cost*, be secured in the deepest mines.

"(*e.*) The raising and lowering of the miners and the clearing of the ores are questions of the first importance. Upon the facilities afforded depend the saving of time and the preservation of health—each of these representing an equivalent in cost.

"(*f.*) The drainage of mines demands the closest attention to the machinery employed for pumping, and the engine-house of every mine should be always kept in a condition of perfect cleanliness, and every bit of exposed metal maintained in a high state of brightness. Power is always wasted where neatness and purity do not prevail.

"(*g.*) Every miner should have a personal interest in the mine in which he labors. His health should be maintained in the highest state of efficiency, and in the event of accident or disease, occasioned by the conditions under which he labors, a provision should be made for securing the best attention to necessities.

"(*h.*) Every possible improvement should be introduced for economizing the labors of the dressing-floors. If possible, every process should be carried out by mechanical appliances, and all machines should be as nearly automatic as engineering skill can render them.

"(*i.*) The education of the future mine agents should be most carefully attended to, especial regard being had to their knowledge of the applications of science to the economical and useful arts. It does not appear desirable that the mind of a workingman should be burdened with the details of scientific refinements, but of all the great laws relating to the applications of the physical forces he should have a clear conception.

"(*k.*) As altogether the wealth of the nation is increased to the extent of £100,000,000 a year by mining operations and its allied industries, it is of the utmost importance that every possible improvement should be adopted to support this important source of our national wealth.

"As no tradesman would have a chance of succeeding in his business without his well-kept day-book and his carefully-adjusted ledger, it is quite as important to train the miner in a careful system of registering the details of production, and of recording the progress of subterranean operations by the most accurate surveys, and by preserving those 'Mining Records' in some appointed place, where they can be at all times consulted, not only without difficulty, but with convenience.

"The matters to which especial attention must be solicited are of the utmost importance if mining in the future is to be a profitable industry. Beyond these, to enable the adventurers in our home mines to compete satisfactorily in the metal markets with the proprietors of colonial and foreign mines, and to realize a profit on the sale of their minerals, it is absolutely necessary to study the strictest economy, and to establish—beyond the risk of any failure—the highest principles of honesty in every department, directly or indirectly connected with British mining."

These are the conclusions that Dr. Hunt reaches after an elaborate study of British metal mining. Practically, it is therefore: Drill, blast, ventilate, pump, hoist, dress, survey, brothers, with care. If English mining engineers need such advice, they are really to be pitied. Aside from the question whether the English metal mines have "petered out" or not, the leading cause for their decay is simply that they can not produce the metals at figures at which their foreign competitors can live and thrive. The improvements in transportation facilities by land and by sea, the opening out of fuel supplies, the working of easily accessible surface deposits in many parts of the globe, have probably done as much if not more to make British metal mining unprofitable and uninviting than causes nearer home. Modern improvements in many departments of engineering have annihilated distance and have caused additions annually to the list of the competitors of English miners. Capitalists find it more profitable to skim the cream from the resources of lands many thousand times as large in area, in all parts of the world.

CONDENSATION OF SULPHURIC ACID GAS.

In the *Berg- und Hüttenmännische Zeitung*, No. 42, 1884, there is a description, with illustrations, of a somewhat complicated and elaborate apparatus in use at Rosdzin, in Silesia, and patented by the owners of the works. The sulphurous gases from the calcining-furnaces are taken to a lead-lined tower packed with coke, flints, or any other suitable material, in the usual manner, down which water trickles from a cistern on top of the tower; the water absorbs the sulphurous acid gas, and also the sulphuric acid and soluble sulphates that may be carried over from the calciners. It then flows out of the bottom of the tower, and is taken through a lead pipe to a series of closed shallow lead pans, a dozen in number, arranged one above the other in a fire-brick chamber, through which pass the hot gases from the calciners on their way to the condensing-tower. The lead pans communicate with each other by lead pipes, placed in diagonally opposite corners, and arranged so that the liquor is taken out from the top of each pan and flows into the bottom of the pan below it. The hot gases passing around and between the pans cause the liquor to leave the lowest pan at considerable heat. This hot liquor then rises through another lead pipe to the top of a smaller tower, of cylindrical shape, and lined with lead, in the center of which revolves a shaft covered with lead and having several disks of lead attached to it. These disks, revolving on the shaft, alternate with fixed ledges or shelves on the sides of the tower, and as the liquor flows down in a cascade over these ledges and disks, it is broken up into very fine spray. At the same time, a current of hot air is passing up the tower, and takes up and carries away the sulphurous acid gas that is liberated from the hot spray. It is drawn off from the top of the tower and led away to the sulphuric acid chambers, or other point at which it may be desired to further operate with the sulphurous acid. The hot liquors that have thus been freed from the sulphurous acid taken up in the condensation-tower flow into a long closed cistern of lead, through which pass a large number of lead tubes, arranged like a surface condenser. The air that is to pass into the spray tower is first forced through these tubes, which are surrounded by the hot liquor, and is in this way warmed. The apparatus is so made that the pipes expose sufficient surface to completely cool down the liquor, which then leaves the cistern and is pumped up to the top of the condensation-tower, to again absorb sulphurous acid, etc., and perform the same round. The warm air from the lead tubes is taken through heaters, which are exposed to the hot gases coming from the calciners, and being thus made quite hot, passes into the spray-tower as described. By continually circulating in this manner, the liquor finally takes up a considerable amount of sulphuric acid and soluble sulphates, and when sufficiently concentrated, a portion is drawn off and is evaporated down in lead pans, a corresponding quantity of fresh water being added in the condensation-tower.

THE PROPOSED PENNSYLVANIA COLLIERY VENTILATION LAW.

The Mine Commission appointed by the last session of the Pennsylvania Legislature to revise the ventilation laws, and which has been in session during the summer, has concluded its regular labors at Shamokin. The following articles contain the provisions of the proposed new law:

ARTICLE XII.

Section 1. The ventilation of a coal mine or colliery may be effected by any mechanical appliance, provided there is produced a constant and an adequate supply of pure air.

Section 2. At the expiration of one year from and after the passage of this act, it shall not be lawful to use a furnace for the purpose of ventilating any anthracite coal mine or colliery wherein more than ten persons are employed, and in no case shall a furnace be used where the mine generates explosive gases.

Section 3. The minimum quantity of two hundred and fifty (250) cubic feet per minute for each and every person employed in said mine, and as much more as in the opinion of the inspector, the circumstance may require.

Section 4. The ventilation currents shall be conducted and circulated to and along the face of each and every working place throughout the entire mine in sufficient quantities to dilute, render harmless, and sweep away smoke and noxious gases to such an extent that all working places and traveling roads shall be in a fit state to work and travel therein.

Section 5. All worked out or abandoned parts of the mine or colliery shall be kept free of dangerous bodies of explosive gases.

Section 6. Every mine shall be divided into sections or panels. Each section or panel shall be provided with distinct and separate inlet and outlet air-passages, separated by a natural barrier of coal or stone, except where cross-headings are necessary for the purpose of ventilation.

Section 7. All air-passages shall be of sufficient area to allow the free passage of not less than two hundred and fifty (250) cubic feet of air per minute for all persons working therein, and in no case in mines generating explosive gases shall the velocity exceed four hundred and fifty (450) lineal feet per minute in any opening through which the air currents pass, except in the main inlet or outlet air-ways, or in mines, or parts of mines, where, in the opinion of the inspector, a greater velocity would not in any manner endanger the lives of the workmen therein employed.

Section 8. Not more than seventy-five (75) persons shall be engaged at any one time in any of said sections and panels.

Section 9. Each and every such section or panel shall be provided with a distinct and separate split of pure air.

Section 10. All cross-cuts connecting the main inlet and other outlet air-passages of every section or panel, when it becomes necessary to close them permanently, shall be substantially closed with brick or other suitable building material laid up in mortar or cement, and of sufficient thickness and strength to resist the force or pressure likely to arise from explosions, but in no case shall said air stoppings be constructed or planked except for temporary purposes.

ARTICLE XIII.

Section 1. All doors used in assisting or any way effecting the ventilation shall be so hung and adjusted that they will close of their own accord and can not stand open.

Section 2. All main doors shall have an attendant whose constant

duty shall be to open them to allow transportation or travel through them, and prevent them from standing open longer than is necessary for a person or cars to pass through.

Section 3. All main doors shall be so placed that, when one door is open, another, which has the same effect upon the same current, shall be and remain closed, and thus prevent any temporary stoppage of the air-current.

Section 4. An extra main door shall be so placed and kept standing open as to be out of reach of accident, and so fixed that it can be at once closed in the event of an accident to the doors in use.

Section 5. The frame-work of such main doors shall be substantially secured in stone or brick, laid in mortar and cement, unless otherwise permitted in writing by the inspector.

Section 6. All permanent air-bridges shall be substantially built of such material and of such strength as the circumstances may require, subject to the approval of the inspector.

ARTICLE XIV.

Section 1. The quantities of air in circulation shall be ascertained with an anemometer. Such measurement shall be correctly made by the inside foreman or his assistant once every week at the inlet and outlet air-ways, also at or near the face of each gangway, and shall be entered in the colliery report book.

Section 2. A copy of these air measurements shall be sent to the inspector before the twelfth (12th) day of each month, together with a statement of the number of men employed in each panel or section.

Section 3. Any party who shall neglect or fail to comply with the provisions of this section, or who shall knowingly make any false return in regard to air measurements, shall be guilty of an offense against this act.

PROGRESS OF GENERAL ABBOT'S INVESTIGATIONS ON SUBMARINE MINES.

The annual report of the Chief of Engineers, U. S. A., for 1884, contains the following extracts from General Abbot's report on the progress made by him in his investigations on submarine mines:

In the matter of new explosives, considerable progress has been made. After much difficulty and delay, a ton of explosive gelatine (without camphor) has been received from Nobel's Explosive Company, Limited, of Glasgow; and the experiments to compare it with the camphorated sample of home manufacture, formerly tested, and to accurately determine its fitness for the torpedo service, are now in progress. They already indicate that, in explosive intensity of action under water, the uncamphorated material is decidedly the stronger, and indeed is the strongest explosive ever tested at Willets's Point. At the request of the Chief of Ordnance, a sample was transferred to that department for trial in shell-firing from cannon at the proving-ground at Sandy Hook. Ring trials have been completed with two grades of Atlas powder, and are now in progress with two grades of Judson powder and an improved quality of Rackarock, to test their relative merits in subaqueous work. Forty-three explosions have been already measured, and it is expected to complete the tests of these powders, and perhaps of another new variety, during the present season.

The general results with Atlas powder are the following: It is manufactured by the Repauno Chemical Company, at Gibbstown, New Jersey. Grade A is reported to contain 75 per cent of nitro-glycerine and 25 per cent of a compound base mostly composed of wood fiber. Grade B is reported to contain 50 per cent of nitro-glycerine and 50 per cent of an explosive base chiefly composed of nitrate of soda and wood fiber. Fourteen shots (giving eighty-four gauge records) were fired in the rings with each variety, and the analysis indicates that grade A is precisely equal to dynamite No. 1 in explosive intensity of action when fired under water, and that grade B has 99 per cent of the same strength under the same conditions. The small difference between the two grades is surprising, considering the different chemical compositions, and it can only be affirmed for subaqueous explosions. There is considerable difference in price between the two grades, and the powder is worthy of the attention of officers of the corps directing blasting operations.

At the electrical exhibition at Vienna, in 1883, the Danish submarine mining service exhibited a platinum wire fuse of extraordinary sensitiveness, far exceeding any made before that date. A novel system of operating mines, not without promise of practical value, was based upon this peculiarity, and it appeared important for us to turn our attention in this direction. Samples of the Danish fuses or of their wire could not be procured; but I have finally succeeded in making from materials obtained in this country fuses considerably more sensitive than those exhibited at Vienna. The Danish fuses were thus reported: Diameter of bridge-wire, in millimeters, from 0·0005 to 0·000675; length of bridge-wire, 11 millimeters, of which 2 millimeters have the above fine gauge; resistance, from 9 to 14 ohms; firing current, from 0·38 to 0·05 ampères.

The following table exhibits the electrical tests of a sample of similar uses made last April at Willets's Point from American wire:

TESTS OF SENSITIVE PLATINUM FUSES.

NUMBER OF FUSE.	Resistance in ohms cold.	Current in ampères to reddened bridge.
1	....	0·021
2	57	0·022
3	75	0·020
4	57	0·020
5	54	0 022
6	76	0·020
7	80	0·018
8	51	0·025

These figures prove that we have succeeded in making a fuse uniform in action and of unequaled sensitiveness, which will enable us to experiment with various new modes of operating mines, and to introduce any favorable results into our service.

FURNACE, MILL, AND FACTORY.

The Webster, Camp & Lane Company, of Akron, Ohio, reports improvement in trade. It has lately sold and put in a coal haulage plant (tail-rope system) for the Isabella Coke-Works, at Cokeville, Pa., and has an order for another similar plant for the Columbus & Hocking Coal and Iron Company, of Columbus, Ohio, for its mine No. 25, in the Hocking Valley.

Mr. William Hasenzahl, of Cincinnati, has recently made the following sales of his diamond bit rock-drill for prospecting, namely: One to J. H. Burfeind, General Manager of the Iron King Mining Company and Kingston Smelting Company, Kingston, New Mexico, Henry Peabody & Co., agents; three machines sent to Australia; one to Eugene H. Smith, Tuscaloosa, Ala.; also one that went to Cherokee County, Kansas, and one to Orange County, Florida.

Otis Brothers & Co., Nos. 92 and 94 Liberty street, New York, report that they have closed contracts with Mr. J. P. Witherow, Pittsburg, engineer and contractor for the extensive furnace plant of the Dayton Coal and Iron Company, Dayton, Tenn,, for two of their large 10 by 10 "New Otis" hoists, to be used at those furnaces.

During the first week of the Norton Iron-Works, Ohio, running with only half of the machines in operation, 1955 kegs of nails were turned out. The furnace made an average of about 55 tons of pig-iron a day.

The Moslem iron furnace property, at Moslem, Berks County, Pa., has been sold to Charles Pancoast, Philadelphia, for $85,000.

The Geddes Iron-Works, at Syracuse, New York, which recently failed, publishes a statement in which it is announced that there is no immediate prospect of any definite action being taken by the stockholders or creditors of the company. It is believed that the general financial interests of all will be best conserved by awaiting the probable developments in the near future of the iron and steel industries of the State.

The North Chicago rolling-mills at Chicago, Ill., will shut down in a few weeks for two or three months. Dullness in the trade is said to be the cause of this action.

It is rumored that the Vulcan Steel-Works, at South St. Louis, Mo., are to resume operations under the management of some capitalists. The Vulcan is heavily incumbered with bonds, most of which were assumed by the Ore and Steel Company, but some of which have never been transferred. There has been some talk of selling the property under these bonds.

The work of boring the artesian well at the Lebanon furnaces, Pennsylvania, is still in progress, a depth of 1300 feet having already been attained with the diamond drill in operation.

In the suit of Rose Martin, administratrix of the estate of Patrick Martin, against the Calumet Iron and Steel Company, which was on trial at Chicago, November 6th, the jury awarded the plaintiff a verdict for $5000 for the loss of her husband, who was killed on October 1st, 1882, while in the employ of the company as fireman.

The Lemont Furnace, of Hogsett & Co., at Lemont, Pa., which has been closed for several months, started up November 13th, giving employment to 500 men. The furnace has a capacity of 100 tons a day.

Hugh W. Adams & Co., pig-iron commission merchants, of No. 56 Pine street, this city, have made an assignment to Henry N. Leroy, giving preferences for $21,641. The failure is the result of the individual embarrassment of Mr. Adams in undertaking to carry out the iron work for the new Potter building, at Park Row and Beekman street. The New York City Iron-Works has the contract to furnish the iron for that building.

A conference was held at the office of the American Iron and Steel Association, at Philadelphia, Pa., November 11th, between representatives of steel manufacturers and of the army and navy. The purpose was, to inquire into the best means for the making of heavy guns for the government.

Secretary McCulloch and Assistant-Secretary French gave a hearing, at Washington, D. C., November 11th, to a committee from Philadelphia representing the importers of tin plates, who complained that a uniform rate of duty on tin plates had not been imposed at New York, Philadelphia, and other ports, and asked that the matter be investigated. They were informed that their request for an investigation would be complied with, and if it was found that there was a difference in the rate of duty imposed at different ports, steps would be taken to apply a remedy so as to insure a uniform rate.

The American Pneumatic Iron Company, of Milwaukee, Wis., and Chicago, Ill., has purchased the Nes Silicon Steel-Works property in Sandusky, Ohio, and will remodel the works and begin the manufacture of bar, band, and round iron about April next. The company paid $30,000 for the property, and will expend $80,000 in making improvements. The works have been idle, with the exception of a few months, for about twelve years. Cleveland parties were negotiating a few months ago for the purchase of this property.

The Brown Hoisting and Conveying Machine Company, of Cleveland, Ohio, has a contract for a full plant for handling coal for a large chemical works at Dombasle, France, and has sent Mr. Charles W. Kelley to France to superintend its construction. Mr. Kelley will go directly to Paris, and will remain until the plant is completed and fully tested in practical work. The Brown plant lately completed at Ashtabula Harbor has been thoroughly tested by loading several vessels. In loading the last vessel, the men, with three machines, took the coal from the cars and deposited it in the vessel at the rate of four tons a minute.

The extensive and valuable real estate of the Kemble Coal and Iron Company, at Riddlesburg, Bedford County, Pa., which recently failed for nearly $1,000,000, is advertised to be sold by the sheriff on the 15th of November. It consists of the two blast-furnaces, coke-ovens, railroads, dwelling-houses and other improvements at Riddlesburg, 32 tracts of land, nearly all of which contains coal or iron ore, and the mineral rights in 17 other tracts. It is intended that the change of ownership shall not interfere with the operation of the works.

The Oliver & Roberts wire mill, at Pittsburg, Pa., is idle on account of dull trade, no orders sufficient to operate the works being on hand. The rod department is running full-time, in order to create a stock of rods for spring. The wire-works daily consume double the amount of rods turned out by the works.

The schedule in the assignment of Rezin A. Wight, President of the Nimrod Furnace Company, to Leighton Williams, was filed in court, in this city, November 10th. It shows liabilities of $612,468, made up as follows: Preferred creditors, $127,500; general creditors, $459,968; and contingent liabilities, $25,080; nominal assets of $518,498 and actual assets $51,407, the actual value of which is but $2807.

The stove plate and furnace foundry of Uzal Cory, at Jersey City, N. J., was destroyed by fire November 11th.

The Western Nail Association, at its meeting at Pittsburg, Pa., November 12th, reaffirmed the present card rates. Business was reported to be fairly active, with prices low and stocks light. The next meeting will be held at the usual time in December.

The Spaulding iron and nail-works, in Jefferson County, Ohio, shut down November 10th for an indefinite period, throwing 130 men out of employment. The cause is accumulation of stock and small demand.

D. W. C. Carroll & Co., of Pittsburg, Pa., have just shipped two steel barges of 30 tons capacity to South America, for use in transporting copper ore.

It is stated that the Lehigh Valley Railroad has made a contract with the Bethlehem Iron Company for 10,000 tons of steel rails, to be delivered during the winter and spring. The price at the mill, which is on the line of the Lehigh Valley road, is said to be $27 a ton.

RAILROAD NEWS.

Mr. F. B. Gowen is said to have practically taken charge of Philadelphia & Reading Railroad affairs again. He is given as authority for the statement that the Central Railroad of New Jersey passenger earnings up to November 1st are about $400,000 ahead of the corresponding time last year. Freight earnings have fallen off largely, on account of the coal trade.

The receivers of the Philadelphia & Reading Railroad Company held a meeting at Philadelphia, November 11th, at which the financial condition of the corporation was considered. It is stated that the question of paying the December dividend of the Central Railroad Company of New Jersey will be taken up, but that the conclusions of the conference will not be made public.

The Pennsylvania Railroad's new Schuylkill Valley branch will be opened through to Reading November 17th.

The new Denver, South Park & Pacific High-Line Railroad, between Leadville and Denver, is now completed.

An imperial decree has been issued in China, inviting proposals for the construction of railroads through the northern part of the empire. It is stated by the same authority that the emperor's father, Prince Ch'un, who has been hostile to every thing foreign, has sanctioned the new departure, and ordered a lot of rails from the mills at Osnabrück, Germany.

The Baltimore & Ohio Railroad Company's operations for the fiscal year ended September 30th, 1884, showed the revenues of the company to be nearly $19,500,000, an increase in the surplus fund of $1,900,000.

LABOR AND WAGES.

A meeting of the Schuylkill Division of the Miners and Laborers' Amalgamated Association was recently held. Reports received from the different branches in the county showed that the organization is gaining a foothold in the anthracite coal region. Another meeting will be held the first idle Saturday in December.

Three hundred furnace hands and miners went on strike November 7th, at the Shenandoah Iron-Works, in Page County, Virginia. The cause of the strike was the company's failure to pay two months' arrears in wages. The miners have since returned to work.

Pascal Cros, a delegate from the Workingmen's Association of Marseilles, France, to this country is now here, for the purpose of continuing the inquiries made by the committee sent here in 1876 from Marseilles and that sent last year from the Paris Trades Assembly. He will probably visit all the large cities.

The Central Labor Union of this city held its regular weekly meeting November 8th. It was decided that the secretary communicate with the Hocking Valley strikers, with the view of sending them financial aid. At the next meeting, November 16th, the question will be discussed as to the best way of stopping the hiring of under-priced laborers at Castle Garden in all trades.

The efforts to bring the miners' organizations into the Knights of Labor are reviving.

The Pennsylvania & Reading Coal and Iron Company has issued an order to its employés throughout the Girardville District to work until half-past six o'clock during the first five days of every week and on Saturday until half-past five o'clock. This was done, it is supposed, owing to the large number of orders the company has on hand for shipment this month, which could not be shipped otherwise than by working over-time. At the Preston Nos. 2 and 3 collieries, the men refused on Saturday last to work longer than the usual time, notwithstanding that they were told they would be paid for all the over-time worked.

The Delaware, Lackawanna & Western Railroad Company has discharged about twenty-five workmen from service in and about the Hoboken terminus, and about one hundred other employés along the line of the road.

Over twelve hundred of the striking miners in Colorado returned to work November 4th. The men return to work on an agreement between the miners and the managers made by the joint conciliation committee to the effect that the settlement of all grievances and differences when made shall date back to the time when the men return to work. This will apply to the question of wages and to the question as to how many pounds should be counted for a ton of coal.

At the Gloucester (N. J.) Iron-Works, wages have been reduced twelve per cent.

Governor Hoadly, on November 11th, issued a proclamation to the citizens of the three counties in which depredations have occurred on account of the strike among the miners. He enumerates acts of destruction by incendiaries, and intimates that they are in a great measure owing to the sympathy extended to the strikers by citizens, and calls on the latter to use all their efforts to preserve the peace by discontinuing all unlawful acts and aiding the local authorities in their efforts to preserve property and the peace. He assures them that, if the disturbance continues, it will be suppressed if it requires the entire military force of the State. At a meeting of the Columbus Board of Trade, the course of Governor Hoadly was indorsed.

The strike of the river coal miners, which was begun last June, was broken again November 13th, by the surrender of the 1500 men employed in the third pool. They returned to work at 2½ cents a bushel, half a cent less than the rate paid when the strike was begun, and a cent less than the rate demanded. The men in the two lower pools are still out, but they are expected to give in before the close of the week.

The Grand Jury has returned true bills against Mr. Costello as President of the Miners' Association, and against seventy-eight of the miners charged with conspiracy. There are three counts against Costello, and a special effort is making to convict him as the leader of the miners in their late trouble at Coal Center and Wood's Run in the fourth pool.

COAL TRADE NOTES.

ILLINOIS.

The Rhoads & Ramsey Company, at Chicago, has been incorporated to mine coal and minerals; capital stock, $100,000. Incorporators, Theodore Rhoads, William W. Ramsey, John E. Case, and John D. Adams.

MARYLAND.

Report for the week ended November 5th: Hoffman, Eckhart, Alleghany, and New Hope, full-time. Borden, 5¾ days. Ocean, Detmold, and Koontz, full-time. Old 'Coney. 5¾ days. New 'Coney, 5¾ days. Jackson, 3¼ days. Hampshire, full-time. Franklin and Phœnix, half-time. Potomac, full-time. Midland, one day.

MEXICO.

In the Sierra of Carbonera, near the city of San Luis Potosi, a coal-bed has been discovered whose present indications promise the most favorable results.

The coal mines in Zacualtipan District are attracting the attention of foreign capitalists.

MISSOURI.

The forty-acre mining tract of the Rich Hill Coal Company is now loading from 15 to 20 cars of coal a day. Twenty-five cars will be loaded from these "diggin's."

The Keith & Perry Coal Company has a standing order with the Gulf Railroad for 75 cars of coal a day—25 of which are to be shipped from the Carbon Center mines, and the remainder from the main or Rich Hill mines.

OHIO.

The sale of the plant of the Wellston Coal and Iron Company was consummated November 7th. The new company will be known as the Wellston Coal Company.

The Eliza furnace will probably have to blow out for lack of water.

At East Palestine, the State Line bank only averaged about half-time during the month of October, and the Prospect mine is running about one day a week.

OIL.

Oil in large quantities has been struck at Webster, and crowds are flocking to the spot. The oil is of good quality, and the two wells already in operation are running 200 barrels a day. Many new wells are going down.

PENNSYLVANIA.

ANTHRACITE.

The Buck Ridge and Greenback slopes, which are located close to the Bear Valley slope, which was on fire recently, are idle. The former is filled with water to extinguish the fire which originated there three months ago, and its workings being connected with the Greenback colliery, work can not be resumed there until the water is taken out of Buck Ridge. About 1000 men and boys are thrown out of work in consequence of the trouble at these collieries, which in all probability will not resume before spring.

The Enterprise colliery, at Port Bowkley, owned and operated by Andrew Landon, of Buffalo, in which an extensive cave-in took place recently, will be reopened next week, and the shipping of several hundred tons of coal daily will be commenced. New and powerful pumps were put in operation November 10th, and water is raised at the rate of three feet a day. The opening of the mine will give employment to 500 men.

The Hanover Coal Company is operating from its new shaft.

The Avondale colliery air-shaft of the Delaware, Lackawanna & Western Coal Company is entirely completed.

Regular mining operations have begun at the Lehigh Valley Company's Dorrance colliery.

BITUMINOUS.

The Venture Coal Company, on the Monongahela River, has concluded to avoid future strikes by forming an industrial partnership with its men.

The Barclay Coal Company reports its income from rent of railroad and royalty on coal for the month of October as $7304; previous receipts, $63,584; total for ten months, $70,888.

COKE.

The verdict rendered as to the recent explosion at the Youngstown mines shows that the victims came to their death by the explosion of fire-damp, and from the effects of after-damp, and "that the said company was remiss in not providing a trapper or trappers, to properly direct the air-current, and also in not having a competent person to examine the mines previous to the explosion."

The next meeting of the Coke Association will be held at Everson, that point being more convenient than Pittsburg.

It has been decided by the coke pool to increase the price of coke from $1.10 to $1.25 a ton after the 20th inst.

The new coal-crusher and washer of the Isabella Furnace Company, at Coketon, in Westmoreland County, will be ready for operation the first of the coming month. The new buildings and machinery are much larger and better than the old ones recently destroyed by fire.

NATURAL GAS.

The W. P. Dilworth well, at Stroup's Ferry, which is drilling by Joseph Clark, is down 1300 feet, and there are good prospects of a strike.

The rigging of the gas prospecting well at A. Soulier & Co.'s schudery, Beck's Run, is up, and drilling will soon begin.

The casing to shut off the heavy vein of salt water at Jones & Laughlin's well has not arrived yet, and the hole is drilling deeper in the mean time. The bit is pounding slate at 1800 feet below the surface.

It is reported that Graff, Bennett & Co.'s well will be abandoned as a useless venture. Salt water is the cause.

The suit of Edward O. Emerson *et al. vs.* the Commonwealth was a quo warranto at the relation of the Attorney-General, setting forth that the Penn Fuel Company claimed certain corporate rights in relation to the supply of heat and light from natural gas to Pittsburg since 1882. That on the 19th day of January, 1882, letters patent were issued to the Fuel Gas Company for the same purpose, and that by the incorporating act exclusive privileges were granted to the latter company until it had paid an 8 per cent dividend for five years on its capital stock. The case was heard in the court below by Judge Stowe, and his decision was rendered in favor of the Fuel Gas Company, declaring that this company held under its corporate privileges the exclusive right to furnish heat and light produced from natural gas to Pittsburg—on the theory that the decision thus granting exclusive privileges to a corporation was unconstitutional and against public policy.

VIRGINIA.

According to the *Virginias*, the Southwest Virginia Improvement Company is making large shipments of semi-bituminous steam and domestic coal from its mines at Pocahontas to Norfolk, for coastwise shipments. The company mined 182,054 tons of coal from January 1st to October 1st this year.

GENERAL MINING NEWS.

ALASKA.

Lieutenant-Commander H. E. Nichols, in a dispatch to the Navy Department, September 15th, says that Juneau is still the only important mining place in the district. The placer mines seem to be pretty well exhausted, the principal attention being given to prospecting for quartz. Less than fifty miners are now working in the placers of the Basin. Wrangel has about lost the importance it once had, as the port of entry for British Columbia. Trading there is not extensive.

ARIZONA.

GILA COUNTY.

OLD DOMINION.—The company's production for thirty days ended November 1st was nearly 550 tons of copper almost pure.

MARICOPA COUNTY.

ITHACA CONSOLIDATED.—The company's property consists of a group of six namely, Mexican, Hickies, Boss, Bonita, Monarch, and Spring mines, situated about 40 miles north from Phœnix. It is stated that the necessary machinery has been purchased and paid for, without calling on the stockholders for an additional dollar in the way of assessment. From the glowing accounts published in San Francisco papers about this company, it would seem as if preparations were making to boom the stock, and sell the remaining shares of the working capital.

CALIFORNIA.

MONO COUNTY—BODIE DISTRICT.

STANDARD CONSOLIDATED.—Mr. A. Pettibone has made the following report, dated September 2d, the publication of which was strangely delayed until late last week: In accordance with your instructions, I visited the property of the Standard Consolidated Mining Company, at Bodie, California, arriving there on July 7th. I found the so-called old workings from the original shaft, which has long been abandoned, were not accessible; but, from the main shaft, of which at 385

feet the first level is reached, I examined the workings from the 385, 500, and 700-foot levels; though the shaft is 1200 feet deep, with levels at 1000 and 1200 feet, these could not be reached, being filled with water. While a large amount of ground has been worked, and ore extracted from the 385 and 500 levels, there are still exposed in the various veins large quantities of ore: it is mostly of such low grade as not to be profitable to mine or mill. There were fifty men employed in stoping and prospecting. From samples of ore taken from the various veins at different points, which samples I forwarded to New York, and since my return have had carefully assayed, the following results were obtained:

ASSAYS.

Nos. 1 to 14 inclusive were made from samples taken from the 385 level, and workings between that and the 500 level.

Value per Ton.

Trace	$7.65	$3.09	$10.33	$3.09	$2.06	$2733.23
No. 1	2	3	4	5	6	7
$3.09	$4 12	$7 21	$5.15	$4.12	$3.09	$5.15
No. 8	9	10	11	12	13	14

Or 12 samples average $4.85, one $2733.23, and one a trace of gold only. Nos. 5, 6, and 7 were from the same stope, showing the great variation of value of ore in the same vein and within a short distance.

ASSAYS.

Nos. 15 to 24 inclusive, from the 500 level.

Value per Ton.

$311.83	Trace	$2.06	$5.15	$9.27	$3.09	Trace	$3.09	$5.15	$6.18
No. 15	16	17	18	19	20	21	22	23	24

Or seven samples average $5; one, $311.83; two, traces only.

ASSAYS.

Nos. 25 to 27 inclusive, from 700 level.

Value per Ton.

$8.24	$9.27	$258.64
No. 25	26	27

The main vein has as yet only been reached in this level. From a deposit of tailings from the Standard mill, estimated to be from 6000 to 8000 tons, assays were made from samples taken, resulting from 14 samples an average of gold, $6.73; silver, $4.21; or total average of $10.94 per ton. I am informed that these tailings are now worked at the Bulwer-Standard mill, and a fair proportion of the assay value secured. The surface property of the company is all in good condition and complete, with buildings, machinery, and tools, and all facilities for the proper conducting of the business, excepting pumps, that at the main shaft not being of sufficient capacity to clear the mine of water from the lower levels. The future success of the company is greatly dependent on the exercise of a rigid economy in the management of all of its departments; while naturally, after a long term of great prosperity of a mine, expenses are deemed necessary that, with a reduced output of ore and reduction in the number of men employed, might be found possible to materially lessen, and the practical working of the property not injured by the retrenchment. The present cost of salaries and office expenses, exceeding $20,000, should admit of a material reduction. As the stock of the company is mostly held in the East, and distributed among several hundred holders, I would suggest that a branch office of the company be opened in New York, thus affording stockholders increased facilities for obtaining information as to its affairs, which office could be maintained at a less expense than the present arrangements there.

NEVADA COUNTY.

Malcolm McLeod's hydraulic mine, at Hunt's Hill, has been sold at sheriff's sale to George E. Turner, judgment creditor, for $1017.75.

WASHINGTON.—The company's ground and hoisting-works, Grass Valley, have been sold at sheriff sale to Herman Uphoff, judgment creditor, for $2076.75.

CANADA.

PROVINCE OF NEW BRUNSWICK.

NEW BRUNSWICK ANTIMONY MINING COMPANY.—Boston papers state that the assessment is not paid satisfactorily, and unless there should be a more general response, it is possible that the debt-holders will be forced to take possession.

PROVINCE OF ONTARIO.

The Port Arthur *Daily Sentinel* of October 15th says: A few days ago, there was an uneasiness perceptible in the pulse of our citizens, and those of them who are mining men in particular, over the reported discovery of another silver mine seventeen miles back of the Rabbit Mountain mine, about on the course of that vein, which was said to surpass in richness the wonderful specimens that came from that mine. Now we have no doubt of it; for we have seen the silver, not in small nuggets or pocket specimens, but in larger masses of ore weighing sixteen pounds and upward, with the beautiful white native and the black and purple-colored sulphide of silver so thickly imbedded and intermixed with calc-spar and crystalline quartz that it presents a beautiful sight, and brings well home to our understanding the excitement that prevails in mining districts among parties in search of the precious metals. A few hundred pounds have been brought to town from the Silver Mountain mine as mere samples of tons upon tons that are in view on the vein.

The vein itself is a beautiful sight. It is a large one from two to ten feet wide, boldly splitting a bluff or mountain 200 or 300 feet high, and in this respect it resembles the vein of 97 T. The Silver Mountain vein has been traced upward of five miles, showing it to be a strong one. There are also large caves in it in which a man can walk, walled in with silver. Explorers and surveyors are now in the neighborhood seeking new discoveries; for it is generally believed that the great silver region of this wealthy mineral district has at last been located.

Commencing with Rabbit Mountain and the silver on the three locations near it known as 95 T, 96 T, and 97 T, and now out to the great new find of Silver Mountain, we may say that nowhere else in the district has so much silver been found as in this region of country. Taking a central point, all these finds are within a seven-mile radius of a circle.

Tons of high-grade ore were shipped from the Rabbit Mountain mine when it could be hauled out last winter. Tons of it have been taken out since, and now lie ready for the roads to get in condition to haul it for shipment. A large quantity of high-grade ore lies on the dump of the Twin Cities mine, which will be working on a large scale in a few days. Fine silver has been exposed on 95 T. The bold, strong vein on 97 T now shows up a very high grade ore of silver; but notwithstanding all these, great as they are, they appear insignificant as compared with the great new find at Silver Mountain, where it is said enormous quantities of high-grade ore are in sight. Six assays were made of the ore, which went from 550 to 24,600 ounces to the ton.

The want of a railroad into this region is much felt. It is impossible to haul out ore in wagons over roads in that district, and the sooner the parties interested in the railroad project that is to give accommodation to that region build their road, the sooner will Port Arthur be materially benefited by the great mining boom that has undoubtedly struck us. On every side of us where practical work was done, good results have followed. As citizens, we should take a keen interest in the development of the mines that are likely to make the town a great mining center. The interest in the old reliable working mines is lost sight of in the excitement that the new discoveries, and especially the discovery of the Silver Mountain mine, have created. This mine was pointed out to Oliver Daunais by the same Indian, Wisaw, who showed Mr. Daunais the Rabbit Mountain mine. Mr. Daunais became the patentee, and now Captains Richard and John Trethewey, late of Silver Islet, have become interested in it, and the former will take charge of the new find, while the latter continues his successful labors at Rabbit Mountain. Men are at work cutting out a road from the Twin City mine to the Silver Mountain find, and are already within four miles of the latter. When snow flies, the roads will freeze up, and then the ore-hauling will begin, and the Rabbit Mountain District, with its several mines at work, will fairly hum.

In connection with the announcement of the above discoveries, it may be interesting to quote the following, written by Mr. C. A. Trowbridge, Secretary of the Silver Islet Consolidated Mining and Land Company, in the report of the directors of that company, dated February 25th, 1884. Mr. Trowbridge's surmises, it will be seen, have been borne out: Some thirty years ago, it was generally believed the only valuable copper mines on the south shore of Lake Superior were the Cliff mine, on Keweenaw Point, and the Minnesota mine, on the Ontonagon River, some eighty miles to the west of it; and when it was suggested, it did not seem possible that nature would deposit all the copper of that country at those two points, and that there must necessarily be other localities in that country that would produce it in as great or even greater quantities than those mines were yielding, the idea was regarded as visionary, and those making the suggestion were ridiculed. Enterprising prospectors, however, pushed into the Portage Lake country in search of copper. The result has shown that what copper was produced by the Cliff and Minnesota mines, large as it was, was small indeed, when compared with what Portage Lake and its vicinity have yielded. Judging from an analogous stand-point, is it at all probable that the only valuable deposit of silver on the north shore of Lake Superior was at Silver Islet, when such a vast extent of country there is known, from partial surface examinations, to be almost literally filled, as it were, with silver-bearing veins? It does not seem possible.

COLORADO.

CHAFFEE COUNTY.

SEDALIA.—The south drift is in 70 feet, showing black oxide of copper and pyrites, running from 38 to 55 per cent copper and from 9 to 10 ounces in silver. A test lot has been shipped to New York, according to the Buena Vista *Times*, where an offer of $1.70 a unit for the copper can be obtained, owing to the fact that the copper is absolutely pure, no arsenic, antimony, or other foreign impurity being present.

CLEAR CREEK COUNTY.

The whole business portion of Silver Plume, a mining village of several hundred inhabitants, near Georgetown, was burned recently. The loss is estimated at $100,000. Several persons lost their lives.

DOLORES COUNTY.

ALMA MATER.—Alma Mater Nos. 1 and 2 have been leased for one year.

GRAND VIEW.—This smelting company will buy at $30 per ton for treatment all of the desirable ore that may be delivered at its works in Rico, at New York quotations for gold and silver, less ten per cent, and twenty cents a unit for lead over ten per cent.

GILPIN COUNTY.

CONSOLIDATED BOBTAIL.—Since the company was compelled to abandon the Bobtail lode, on account of its poverty in the lower levels, and the large quantity of water coming into the mine, it has been prospecting and developing with varying success other lodes owned by it. The switch lode has been worked at a profit for several months past, and there are fair prospects in other lodes that are developing.

GUNNISON COUNTY.

The successful treating of all refractory minerals at Gunnison has induced, it is said, the Union Pacific Railroad to make the rate one half less than it was formerly.

HINSDALE COUNTY.

CROOKE.—These mining and smelting-works at Lake City are having trouble. Owing to the bad condition of the roads between the works and the mines, the works have not been able to make expenses. The stockholders have so far refused to make good the deficit. Some of the employés are two or three weeks behind in their pay.

LAKE COUNTY.

BIG PITTSBURG.—The lessees working through the Stonewall Jackson shaft are producing considerable ore running well in silver and very heavily in lead.

LITTLE CHIEF.—The company is working the main shaft on the property, under the supervision of its manager.

WOLFE TONE.—Operations for active work on this mine are making. As soon as the machinery arrives, and is placed on the property, the mine will be vigorously developed.

LA PLATA COUNTY.

It is rumored that Mr. N. P. Hill contemplates the erection of extensive smelting-works at Durango, designed especially for the treatment of copper ores.

PARK COUNTY.

The rate on lime rock to Leadville has been raised to $3 a ton. This is likely to bar out Fairplay rock, as present smelter charges will not justify the quarrying of it.

BOND.—Scarcity of water has caused the stamp-mill to shut down, and it is reported that the leasers have decided to throw up their lease.

CUMMINS.—Work on this placer has been suspended for the season. It has been put in shape for extensive work next spring, and it will then be prosecuted with vigor. The ground on this placer is rich.

FANNY BARRET.—It is reported that the mine will soon be started up by the company. It has been worked under a lease during the summer, and has been paying a good profit.

PITKIN COUNTY.

SPAR CONSOLIDATED.—The company has under consideration a proposition to bond the Chance and Little Nell mines for the sum of $60,000.

SAN JUAN COUNTY.

The reader will please substitute the following for that which appeared in last week's issue under "CROWN POINT:"

CROWN POINT.—This mine, on Solomon Mountain, is showing well for work done on assessment for this year. The ore is high-grade galena and gray quartz.

CROWN POINT (SULTAN MOUNTAIN).—A mill-run at Comstock & Co.'s mill recently was: weight, 5260 pounds; assay per ton, gold, half an ounce; silver, 53 ounces; lead, 4 per cent; copper, 4½ per cent.

SUMMIT COUNTY.

But little prospecting is done in Ten Mile District at present.

ROBINSON CONSOLIDATED.—About forty tons of ore a month are shipped.

DAKOTA.

FATHER DE SMET.—The report for the week ended November 8th shows ore extracted from first, second, and third levels, 1950 tons. Ore milled, 1950 tons.

GOLDEN REEF.—At this property, which was recently sold, the work of development will be pushed vigorously by the present owners.

MEXICO.

The Mexican *Financier* reports the following:

The Legislature of Oaxaca has passed resolutions that all capital shall be exempt from State taxation that is invested in mining, reduction of ores, and machinery, utensils, and effects used in the operation of mines and smelting of ores. The proprietors, employés, and laborers in the mines will also be exempt from service in public positions and in the national guard except in case of foreign war. The executive is authorized to assign premiums to miners who distinguish themselves particularly by the amount of capital invested or for progress in their work.

Reports from Real del Monte show that the condition of the Jesus Maria and Dificultad mines is very encouraging. One dividend has been paid, and another is expected in a few weeks. The abundance of ore in those mines gives token of a bright future and corresponding benefits to the people in that mining region. The last sales were at the rate of $60,000 per *barra*, but lately there have been no transactions. It is stated that there is great need for a mining exchange at the capital, to facilitate the exchange of mining shares at fair prices.

Rich ores are reported to be extracted daily from the Santa Gertrudis mine. Work on the new shaft called the Guillermo Segura, near the Porvenir, is pushed rapidly. The engine of the Dolores mine continues to work satisfactorily.

MICHIGAN.

COPPER MINES.

The October output of the mines mentioned is as follows:

	Tons.		Tons
Calumet & Hecla	1437	Huron	125
Quincy	352	Peninsula	80
Atlantic	202	Copper Falls	68
Franklin	201	Hancock	40
Allouez	146		

BELT.—According to the Ontonagon *Miner*, instructions have been received from London to close down the mill at the Belt, also all the developments on the Champion lode or the old mine, the present price of copper not permitting the working of that lode at a profit. The mill has been run on rock from the Knowlton vein. The development-work on this lode will be pushed ahead, so that the mill can be kept running on the rock next season.

IRON MINES.

QUINNESEC.—The mine is yielding from 50 to 75 tons a day from the find recently made. The management was just about shutting down the property when the above strike was made. Explorations were begun, and a deposit found that developed into something of considerable importance.

MONTANA.

BEAVERHEAD COUNTY.

HECLA CONSOLIDATED.—The daily output of the Cleopatra mine amounts to about 125 tons. The concentrator closed down for the winter, in order to allow the concentrating ore to accumulate for a big run beginning early in the spring.

NEVADA.

ELKO COUNTY.

OHIO.—This mine, in Rebel Creek District, has been sold for $50,000 to a Salt Lake City (Utah) company. The mine, which has been run on a small scale, has produced very rich ore, which was generally shipped to Salt Lake for reduction. It is the purpose of the purchasers to develop it systematically and to build reduction-works on the ground.

LINCOLN COUNTY.

DAY.—According to San Francisco reports, Manuel Eyre, a shareholder, has brought action against the directors of the Day Silver Mining Company to recover $6000 damages for the alleged failure to comply with the existing law in publishing the bullion output for last month. He believes that the directors have appropriated a portion of the mine's yield of which no record was made.

NYE COUNTY.

ALEXANDER.—This company holds a judgment of $209,431 against Mr. Alexander B. Cooper, of Oakland, Cal., who recently failed.

STOREY COUNTY—COMSTOCK LODE.

The work now carried on at the Ophir is watched with great interest. The Virginia City *Chronicle* says that the drift on the 500 level, which is driving westward, is nearing a point where it is expected to strike a continuation of the body of ore found in the upper workings, known as the Rowe ledge, which has yielded a large amount of milling ore at a depth of only a few feet from the surface. Having encountered a body of water, operations were suspended in the surface workings until it could be drained off. The drift from the Ophir shaft, on the 500 level, is now running for the double purpose of draining this body of water and prospecting the upper workings at that depth. Should a continuation of the ore-deposit in these surface workings be found on the 500 level, it will inaugurate a general system of explorations to the westward from all the mines on the lode.

Large quantities of low-grade milling ore are daily taken from the Gold Hill group of mines, including the Yellow Jacket, Kentucky, Crown Point, Belcher, and Overman. The Chollar is also producing considerable milling ore. The amount of ore found in the upper workings of these mines seems inexhaustible.

The developments of the 2800 level of the Hale & Norcross have been suspended, pending the receipt of orders to proceed from below.

At the Alta, the unexpected flow of water recently tapped has retarded the approach to the ore-body from the drift on the 2150 level.

NEW JERSEY.

DICKERSON.—Mr. William F. Potter, who has had charge of the Dickerson mine for twenty years has resigned his position, and Capt. William Tretheway assumes the general charge of affairs.

NEW MEXICO.

The new reduction-works at Carlisle are fast nearing completion, when the company's bullion output will be doubled. The works will have a capacity of twenty tons a day. The company has on hand a large amount of concentrates, which it will begin reducing next month.

The Cerrillos smelter, together with the boiler and engine, several car-loads of ore, coal, charcoal, cord-wood, and all the personal property connected with the smelter, were sold under an execution by the sheriff November 3d. It was bid in at $6000 by George C. Preston, trustee for the Second National Bank of Santa Fé.

SAN PEDRO & CAÑON DEL AGUA.—A suit in equity has been begun in the District Court at Santa Fé, on behalf of the Boston bondholders of the San Pedro & Cañon del Agua Company, who are opposing the Ballou interest, and the court has issued an order directing said company, Pierce, Ballou, Morse, and other trustees under the first mortgage, together with the purchasers at the sale made pursuant to a decree, to appear the 8th day of December next, and show cause why they should not be enjoined from exercising any acts of ownership under the decree of foreclosure dated August 7th, 1884. The bill also prays that the decree, and the sale thereunder, may be declared fraudulent and be set aside, and that the original mortgage executed to the defendants Pierce and Downing, as trustees, in April, 1880, be adjudged a first lien upon all the real estate, structures, machinery, water-works, and pipe-line, and be prior and paramount to any judgment and lien in favor of the defendants; also for an accounting, and for a receiver to take charge of the property. The plaintiffs in this suit claim that Ballou's proceedings have been carried on in a clandestine manner, and that they intend to fight for a fair showing in court. The Court at Sante Fé has confirmed the sale of this company's property under the recent decree of foreclosure, and the deed of the same by the special master appointed by the court to carry out the sale and convey the property has just been received by Mr. G. W. Morse and Mr. George W. Ballou. The property was bid in at $203,000 by Carroll Sprigg, trustee.

UTAH.

SUMMIT COUNTY.

CRESCENT.—The annual meeting was held at Salt Lake City November 3d. The report shows that in accordance with the resolutions at the meeting of the stockholders held November 5th, 1883, the Nettie mining claim and one eighth of the Roaring Lion mining claim had been purchased by the company. The adverse claims to the Rebellion, Tidal Wave, Mulcahy, and Shamus O'Brien mining claims by the owners of the Centaur and Phœnix mining claims have been settled, suits dismissed, and all the mining property of the country entered for patent without protest. The company has completed and put in daily operation a horse tramway from the Etna or lower tunnel to Park City, about five miles. A concentrator has been erected that can treat 100 tons of concentrating ore a day of twenty-four hours. The grade of the ore has averaged during the year about the same as during 1883. While producing 1173 tons more than in 1883, the receipts of the company have been less on account of the low price of lead. The total receipts for the year have been $281,075.14, and the disbursements, $125,348.23, leaving a balance of $155,726.91, which represents expenditures for development and prospect-work, extraction of ore, hauling, sampling, etc.

WISCONSIN.

While the Gogebic iron range is not, as yet, experiencing any decided boom, says the *Ishpeming Agitator*, still the outlook is encouraging, and it is expected that the coming summer will witness a material increase in population and business. At the Colby mine, on section 16, town 47, range 46, Captain Moore is engaged in getting out a test cargo of 1000 tons, part of which has already been shipped to Milwaukee via the Milwaukee, Lake Shore & Western Railroad. On section 10, same town and range, a town-site will soon be laid out by the railroad company, the name of the place to be Bessemer. Nearly seven miles farther west, near the Montreal River, another town—Ironwood—will soon be platted. Tributary to the Ironwood will be the Ashland, Norrie, Aurora, Case, Albany, and Vaughn mines, already opened, and the numerous explorations that are carried on in that vicinity. Near Bessemer, are the Colby, Longyear, Trenton, Fay, Chequamegon, Black River, and Hart & Shore's mines, and in this locality also some exploring is done. This insures the location of two good towns on the east side of the Montreal River. On the west side, the Northern Chief Mining Company laid out a town on section 24, town 46, range 2 east, Wisconsin, and has named it Hurley. General lots have been sold in Hurley. It is rumored that another hamlet will be platted at Wakefield station.

SAGINAW.—The company, which has been conducting exploratory operations on its property, has made a strike reported to be even better than the old mine, at a point about 500 yards southeast of the old workings.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED SEPTEMBER 2D, 1884.

304,288. Hand Rock-Drills. Howard S. Bailey, Denver, Colo.
304,313. Method of Casting Steel. Francis K. Haffey, Alleghany, Pa.
304,332. Boiler Furnace. William Lowe, Bridgeport, Conn.
304,342. Rolling-Mill. Frederick Melber, Sharpsburg, Pa.
304,395. Mining-Machine. Benhard Yoch, St. Louis, Mo.
304,428. Smoke-Consuming Furnace. Wilhelm G. A. Heiser, Berlin, Germany.
304,471. Steam Stamp-Mill. William H. Thompson, Cleveland, Ohio.
304,479. Mechanism for Reversing Rolling-Mills. Thomas A. Weston, Stamford, Conn., Assignor to the Yale & Towne Manufacturing Company, same place.
304,500. Manufacture of Solidified Compound Metals. Ferdinand Eugene Canda, New York City.
304,506. Grinding-Mill. Garret B. Davis, Baltimore, Md.
304,537. Rock-Breaker. George H. Malter, San Francisco, Cal.
304,587. Apparatus for Indicating Weights and Testing Strength of Metals. Thomas Henry Ward, Tipton, County of Stafford, England.

GRANTED SEPTEMBER 9TH.

304,703. Rotary Rock-Drill. Alexandre Cantin, Paris, France.
304,714. Suspended Tramway. William F. Ely, Afton, Assignor to Isaac W. Parmenter, Summit, N. J.
304,765. Amalgamator. Simeon Truby, Alma, Colo.
304,773. Process of Purifying Iron and Steel. James E. Atwood, Brooklyn, New York.
304,85 Swivel for Drills. Henry C. Reichardt, Pottsville, Pa., Assignor to the American Diamond Rock Boring Company, New York City.
304,85 Diamond Cutting Machine. Henry C. Reichardt, Pottsville, Pa., Assignor to the American Diamond Rock Boring Company, New York City.
304,976. Mold for Casting. Robert W. Traylor, Richmond, Va.
304,980. Molding-Machine. Thomas H. H. Webster, Baltimore, Md., Assignor of two thirds to William A. Perkins and A. Frederick Keubler, both of same place.
305,031. Separation of Zinc from Galenas Carrying Silver and Metallic Oxides and Sulphides. Pierce B. Wilson, Baltimore, Md.
305,034. Valve for Steam-Pumps. Joseph A. Yingling, Cincinnati, Ohio.

GRANTED SEPTEMBER 16TH.

305,055. Quartz-Crushing Machine. Cyprien Dandurand, Virginia City, Nev.
305,167. Governor for Pumping-Engines. William Fisher and George H. Beebe, Marshalltown, Iowa.
305,172. Stone Breaker and Crusher. Philetus W. Gates, Chicago, Ill.
305,223. Miner's Squib. John R. Powell, Plymouth, Pa.
305,249. Method of Treating Phosphates for Fertilizers. Thomas Bliss Stillman, Hoboken, N. J., and Albert H. Koefoed, New York City.
305,250. Joint-Protector and Igniter for Fuses. Eldridge A. Thompson, Silver City, Idaho.
305,284. Ore-Separator. Francis R. Brown, Boulder, Colo.
305,299. Coal-Screen. George A. Edwards, Wilkes-Barre, Pa.
305,357. Ore Crusher and Pulverizer. Milton T. Van Derveer and John Hegeman, Amsterdam, New York.
305,358. Rotary Engine. Adrianus Anthony Wilton Van Reede, Papendrecht, near Dordrecht, Holland.
305,366. Annealing-Furnace. John W. Arlen, Lowell, Mass., Assignor of one half to Woods, Sherwood & Co., same place.
305,408. Regenerator-Furnace. William Swindell, Alleghany City, Pa.

GRANTED, SEPTEMBER 23D.

305,457. Smoke and Gas Consuming Furnace. Mathias Krudewig, Frankfort-on-the-Main, Germany, Assignor, by direct and mesne assignments, to himself and William Kloh and Isidor Hymes, both of New York City.
305,524. Process for the Manufacture of Acetates directly from Metallic Ores. Jean A. Mathieu, Port Leyden, New York.
305,553. Blast-Furnace. Arthur F. Wendt, New York City.
305,669. Mining-Machine. Francis T. Chew, St. Louis, Mo., Assignor of one half to the Ellsworth Coal Company, Danville, Ill.
305,676. Rock-Drilling Machinery for Oil-Wells, etc. J. E. Davies, Palmyra, and Joshua H. Woods, Alliance, Ohio; said Woods Assignor to said Davies, and said Davies Assignor of one half to Thomas C. Snyder, Canton, Ohio.
305,701. Stamp-Battery. George H. Malter, San Francisco, Cal.

GRANTED SEPTEMBER 30TH.

305,784. Coal Elevator. Peter Best, Elizabeth, N. J.
305,788. Oxidizing and Chloridizing Furnace. John R. Brett, Oakland, Cal.
305,791. Mining-Drill. Hiram C. Burk, Cleveland, Ohio.
305,836. Guide for Steam-Hammers. Thomas R. Morgan, Sr., Alliance, Ohio.
305,846. Process of Working Auriferous and Argentiferous Arsenides and Sulphides. Edward Probert, San Francisco, Cal.
305,877. Mechanical Gearing for Hoisting Devices, etc. William C. Alsdorf, St. Louis, Mo. Mo.
305,949. Amalgamator. William Moller, Yonkers, New York.
305,962. Feeding Apparatus for Rotary Drills. Charles B. Rice, Claremont, N. H.
304,971. Steam Pumping-Engine. Clark Sintz, Springfield, Ohio.
305,972. Mining-Pump. Axel Sjogren, Denver, Colo.
305,983. Gas-Seal for Blast-Furnaces. Edward A. Uehling, Bethlehem, Pa.
305,994. Coal-Mining Machine. Andrew J. Baggs and James T. Baggs, Bridgeport, Ohio.
306,019. Apparatus for Treating Ores. Thomas R. Jordan, London, England.

FINANCIAL.

NEW YORK, Friday Evening, Nov. 14.

Business in the mining market has been more active, but there is absolutely nothing of special interest to report. The dealings have been large as compared with last week, and the prices firm.

Horn-Silver continues to be the feature, and sales amounting to 10,472 shares were made. The price shows a downward tendency; it opened at the beginning of the week at $5 and closed at $4.25. It is said that this stock will sell much lower. The reason of this movement is not known. The reports from the company's property show that every thing is progressing satisfactorily. The decline in lead to 3·40c. may, however, have something to do with the drop in the stock. A few sales of Ontario were made at from $19@$19.38.

Of the Bodie group, Standard Consolidated and Consolidated Pacific were the most favored. The prices of these stocks, as well as Bodie Consolidated and Bulwer, showed no great fluctuation.

The interest in Sutro Tunnel has been revived, and sales amounting to 7000 shares were made at from 12@14c. This stock has received but little attention during the past weeks. The announcement of a dividend of twenty-five cents by the Navajo Mining Company, the first since May, 1883, has not led to much activity in this stock, which is quoted at present at $3.80. The affairs of the company seem to be in a prosperous condition, the cash on hand amounting to about $109,000.

Amie has been the leading Colorado stock, the sales this week amounting to 5800 shares at from 4@5c. Robinson Consolidated, Iron Silver, Breece, and others show considerable business.

The sales this week amounted to 47,152 shares, as against 27,300 shares for the preceding week, showing an increase of sales of 19,852 shares. The tables printed elsewhere give a complete summary of the market.

MEETINGS.

Adams Mining Company, Leadville, Colorado, annual meeting of stockholders and election of trustees, November 27th, at twelve o'clock M.

Continental Silver Mining Company, No. 8 Broad street, New York City, annual meeting of stockholders and election of trustees, November 22d, at two o'clock P.M.

Plymouth Consolidated Gold Mining Company, No. 23 Nassau street, New York City, annual meeting of stockholders and election of trustees November 19th, from twelve to one o'clock P.M.

South Yuba Water and Mining Company, No. 23 Nassau street, New York City, annual meeting of stockholders and election of trustees November 26th, from twelve to one o'clock P.M.

DIVIDENDS.

Adams Mining Company, of Colorado, has declared dividend No. 4, of ten cents a share, or $15,000, and an extra dividend of five cents a share, payable November 20th.

Homestake Mining Company, of Dakota, has declared dividend No. 75, of $25,000, payable November 25th. Total dividends to date, $2,562,500.

Jocuistita Mining Company, of Mexico, has declared a dividend of fifty cents a share.

Lowell Machine-Shop Company, of Massachusetts, has declared a dividend of $25 a share.

Navajo Mining Company, of Nevada, has declared dividend No. 10, of twenty-five cents a share, payable November 13th.

Plymouth Consolidated Mining Company, of California, has declared dividend No. 18, of fifty cents a share, or $50,000, payable on demand. Total dividends to date, $900,000.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the past week:

From Saturday morning till Wednesday evening, the market was quiet, with 74c. the highest and 71⅛c. the lowest. Thursday afternoon, prices broke to 69c. on the news that Fisher Nos. 3 and 6, two important wells, were both large producers, and extended the fertile territory of Thorn Creek east and southeast. After the closing Thursday, it became evident that Fisher No. 3 was exceedingly large, and its first hour's production was about 350 barrels. To-day, it had declined to 170 barrels, but the Phillips No. 1, on Dodd farm, to the northeast, began to flow and widens the territory still more. The Greenlee well, first location east of the Armstrong gusher, came in to-day at 80 barrels an hour, but later in the day increased its flow to 140 barrels. The Phillips & Simpson well, a considerable distance east of the Fisher wells, will be due early next week, and is very important. The market was apparently held up to-day by covering of shorts and some buying by large holders who wished to avert a heavy decline, but it closes with a prospect of lower prices.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 8....	$0.73¾	$0.74	$0.72⅞	$0.73⅛	2,585,000
10....	.72	.73½	.71⅞	.73⅜	3,758,000
11....	.74	.74	.72⅛	.72¾	4,646,000
12....	.72⅞	.73¼	.72¼	.72¾	3,601,000
13....	.72⅛	.72⅝	.69	.69	6,395,000
14....	.68	.70⅝	.66	.69⅜	7,005,000
Total sales.....					27,990,000

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Nov. 7.	Nov. 8.	Nov. 10.	Nov. 11.	Nov. 12	Nov. 13.
Albion	..	..	..	..	..	..
Alpha	..	..	..	..	..	..
Alta	1.12½	1.00	.90	.75	.75	.75
Argenta	..	..	..	..	..	..
Bechtel	..	..	..	..	..	..
Belcher	.75	..	.70	..	..	.50
Belle Isle	..	..	..	..	..	..
Best & Belcher	1.50	1.50	1.50	1.25	1.25	1.25
Bodie	2.50	2.50	2.87½	2.75	2.75	2.87½
Bullion	..	..	..	..	..	..
Bulwer	..	..	..	..	..	..
California	..	..	..	..	..	..
Chollar	2.12½	2.12½	2.00	1.75	1.87½	1.87½
Con. Pacific	.90	.95	.95	.95	.95	.95
Con. Virginia	.20	.20	.20	.15	.15	.20
Crown Point	1.00	1.00	..	.85	.80	.75
Day	..	..	..	..	..	..
Elko Cons	..	..	..	..	..	..
Eureka Cons	..	2.75	..	..	3.00	3.00
Exchequer	..	..	..	..	..	..
Gould & Curry	1.00	1.00	1.00	.90	.75	.65
Grand Prize	..	..	..	..	..	..
Hale & Norcross	3.50	3.50	3.25	2.75	2.75	3.12½
Independence	..	..	..	..	..	..
Martin White	..	..	..	..	..	..
Mexican	.85	.85	.80	.70	.60	.65
Mono	..	..	..	..	..	..
Mount Diablo	3.75	..	..	3.50	..	3.75
Navajo	3.87½	4.00	4.00	3.75	3.75	3.50
Northern Belle	..	..	..	..	..	..
North Belle Isle	..	..	..	..	..	..
Ophir	.80	.80	.75	.55	.55	.55
Overman	..	..	..	..	..	..
Potosi	1.00	1.00	1.00	.90	.95	.95
Savage	1.37½	1.37½	1.12½	.90	.90	.85
Scorpion	..	..	..	..	..	..
Sierra Nevada	.85	.85	.80	.60	.60	.60
Silver King	..	..	..	..	..	..
Tip-Top	..	..	..	..	..	..
Union Cons	.80	.80	.70	.60	.60	.60
Utah	..	..	.55	.50	.45	.50
Wales Cons	..	..	..	..	..	..
Yellow Jacket	1.75	1.62½	1.75	1.50	1.50	1.50

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, Nov. 13.

The market for the two leading copper stocks has been very strong the past week, and Calumet & Hecla shows an advance of $13 over the closing sale of last week, with sales of about 300 shares, ranging from $139@$151, closing firm to-day at $153 bid, $155 asked. The advance is due partly to covering of short sales, as well as to the presence of investment orders; and with no large amount of stock offering, the price has been easily advanced to the present figures. It looks now as if a higher point might be reached before the deal is finished. The October product was 1436½ tons, a decline of about 900 tons from the September output, in consequence of the fire; but as the mine is now working with full force, this loss will doubtless be fully made up before the year closes. Quincy is in steady demand, with but little stock offered. Sales of about 125 shares are reported for the week at $32@$33, mostly at $32½. The stock closed steady to-day at $32 bid, $32⅛ asked. The October product was 351½ tons, about the same as for the corresponding period last year. A small lot of Osceola sold at $9, same as last week. There was nothing doing in any of the other stocks on the list. Atlantic is $6½ bid, none offered. Franklin, $6 bid, $7 asked. These two mines produced in October about 200 tons, each, and ought to be a good purchase at going rates. Pewabic was offered at $2, with no buyers.

In silver stocks, there is but very little trading, and prices are a shade lower. Harshaw sold at 50c., which is about all that is expected to be realized on the winding up of its affairs. This stock sold at one time at $47 a share, and has been a bitter pill for its stockholders.

At the Mining Exchange, business continues to rule dull and inactive. Bowman Silver sold up to 12c. early in the week, on good reports from the mine, but later declined to 9c. and no disposition to operate in it even at this figure. Dunkin, dull at 20c. bid, 23c. asked. Consolidated Pacific is steady at 90@92c., and its friends are confident that it will sell much higher ere long. There is a better inquiry for the water meter stocks, with sales of New England at 45c. and Standard at 30c.

3 P.M.—Calumet & Hecla sold this afternoon at $156 @$157, only six shares; and it was very strong at $156 bid, $157 asked. The rest of the list, unchanged.

BULLION MARKET.

NEW YORK, Friday Evening, Nov. 14.

DATE.	London. Pence.	N. Y. Cents.	DATE.	London. Pence.	N. Y. Cents.
Nov. 8	50¼	108¾	Nov. 12	49⅞	107¾
10	50⅛*	108⅜	13	49¾	107½
11	50	108	14	49 11-16	107⅜

* Weak.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains at 5 per cent. During the week, the bank gained £21,000 bullion; and the proportion of its reserve to its liabilities was raised from 34⅝ to 45¾, against 42¹¹⁄₁₆ per cent at this date last year. The weekly statement of the Bank of France shows a loss of 10,500,000 francs gold and a gain of 500,000 francs silver.

METALS.

NEW YORK, Friday Evening, Nov. 14.

Copper.—Our refiners report quite generally that their engagements make the filling of orders for immediate shipment a matter of some difficulty, a result apparently growing out of the heavy shipments abroad. We quote Lake Copper 12¾@13c., and other brands according to quality 11½@12¼c.

London is again lower, cabling Chili Bars £52 5s., and Best Selected £58.

Messrs. James Lewis & Son, of Liverpool, say in their last monthly report:

The only causes to which the present depreciation can be ascribed are the fear of large American importations; the prospects held out in the recent report of the company of increased supplies of copper from the Rio Tinto mines, to compensate for the diminished value of the copper, iron, and sulphur in the ore; the advance in the Bank rate from 2 per cent to 4 per cent; the general dullness of trade, and the entire absence of all desire to invest in copper on the part of speculators. The statistics we give herewith show an increased production and importation into England and France up to the 30th of September this year, as compared with the same period last year, of 2944 tons fine, and an increased consumption in England and France and export of 14,430 tons. Stocks have consequently decreased this year 8180 tons during the nine months, while last year they increased 3306 tons. Whereas the consumption in England shows an increase of 10,981 tons, that of France shows a decrease of 3879 tons, and the exports from England (exclusive of those to France) show an increase of 7328 tons, of which 3344 tons went to India, and 3984 tons to other countries. Fourteen hundred and seventy-seven tons less copper have this year been imported in the form of pyrites, and the present stock in this country appears to be reduced to a corresponding extent, which should be added to the home consumption as given above. It is apparent that, with the greatly reduced stocks of copper in England and France, any important diminution in the supplies from the Spanish and American mines would have a very material effect on the value of copper, assuming the consumption to continue on its present scale. If the mining companies that have recently announced their intention of increasing their production to counterbalance the effects of lower prices were to adopt a different policy, and diminish, rather than increase, their output of copper, it appears to us that it would be greatly to the benefit of the shareholders. Any advantage derived from the larger quantity of

copper sold will be more than neutralized by the lower prices obtained for it. The deliveries in England and France in October have been on the same large scale as during the previous nine months, namely, 9266 tons. The arrivals from the United States have been 1133 tons less than in September. Regular shipments of American ingot copper are now making, the quality of some brands of which is fully equal to English Best Selected. The arrivals from Chili during the past month have been 2537 and the deliveries 2064 tons, and from other countries 3985 and 4156 tons fine respectively. The Chili charters are 5200 tons.

The arrivals here from the United States consist of 612 tons bars, 198 ingots, 657 matte, and 2852 ore, equal to about 1893 tons of fine copper.

The sales of furnace material have been :

Tons.		Per cent.		Per unit.
250	Prec...Spanish (Cueva-de-la-Mora)		Swa.	10s 6d
83	" ...Mason's		Liv.	10s 1½d
381	Ore... Bolivian		Swa.	10s 3d
390	Reg.... "		"	10s 6d
215	" "		"	10s 6d
811	" ....New Quebrada	20	"	9s 9d
10	Prec...Rio Tinto (B. S.)			11s 3d
1025	Ore.....N. Quebrada (Yel)	10	Swa.	9s 6d
100	" " " "	10	Liv.	9s 6d
100	Prec...Rio Tinto (2d qual.)			10s 1½d
25	" ...English			10s 9d
500	Reg. ..Rio Tinto	35	Liv.	9s 6d
25	Prec...English			10s 10½d
50	" ...Rio Tinto (B S)			11s 1½d
1300	Ore....Betts Cove	8	Liv.	9s 3d
312	Prec...Cueva de-la-Mora		Swa.	10s 6d
150	" .. Rio Tinto (B. S)			11s 1½d
218	Reg. ..Chili		Swa.	10s 7½d
50	" ...Rio Tinto	20	Liv.	9s 7½d
400	Ore ...Libeola	11	Swa.	10s 0d
500	" . .N. Quebrada (Yel.)	10	"	9s 6d
450	" " " "	10	"	9s 6d
200	" ...Cape	30	"	10s 7½d
25	Prec...Mason's		Liv.	10s 3d
75	" ...English			10s 9d
78	Ore....Namaqua		Swa.	10s 1½d
750	" ...Caveira	6	"	8s 0d
4100	" ....New Quebrada	10	"	9s 6d
100	Prec...Rio Tinto (B. S.)			11s 1½d
94	" ...Mason's		Liv.	10s 0d
300	" "		Swa.	10s 0d

Imports of copper (exclusive of pyrites) from 1st January to date are (tons fine) :

	1882.		1883.	
Chili into Liverpool and Swansea	23,906		21,784	
Other countries into Liverpool and Swansea	20,505		30,334	
Other countries into London	8,990	53,401	8,711	60,829
Chili into France	10,829		13,690	
Other countries into France	1,324	12,153	3,880	17,570
		65 554		78,399
Deliveries—ditto—in England and France		70,358		77,604
	1884.			
Chili into Liverpool and Swansea	25,164			
Other countries into Liverpool and Swansea	36,457			
Other countries into London	8,085	69,706		
Chili into France	9,703			
Other countries into France	4,892	14,595		
		84,301	tons fine.	
Deliveries—ditto—in England and France		92,334	tons fine.	

Tin.—The market has been quiet, closing at 17c. for Straits, large lines cash. London cables £75 5s.

Lead.—The lead market has during the week undergone what may fairly be called a panic. Starting early in the week with a sale of 100 tons at 3·55c., sales of about 1000 tons of Refined lead followed at 3·50c., almost all of the metal going to consumers who will put it to common uses, the corroders not being buyers at this time. Lead was then freely offered on Wednesday at 3·45c., but only a few hundred tons were placed with difficulty. Thi was followed by the sale of about 200 or 300 tons at 3·40c., at which a considerable quantity is still available. Buyers, however, will not listen to any offers, and there appears to be nobody with enough confidence in the future of the market to attempt to stay the decline. Buyers argue that we are approaching the dullest season of the year, and express the conviction that when they need it they can get all the lead they want at probably lower figures.

From St. Louis, Messrs. John Wahl & Co. telegraph to us to-day as follows :

Our market is on the down grade, and practically demoralized. There has been a weak feeling all around, carrying down the prices to 3·25c. for both Common and Desilverized. Buyers are as scarce as hen's teeth, and even 3·25c. is no temptation. Sales for the week run up to 20 tons of Common at 3·25c.

From Chicago, Messrs. Everett & Post telegraph to us as follows to-day :

The market is very flat and weak, and nominally 3·25@3·30c. Absence of buyers is effecting a decline.

Spelter.—This metal has weakened further, and is offered at 4·35@4·40c. for Common Domestic.

Antimony.—There has been no change.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 14.

American Pig.—The principal features of the market are a fair demand and a comparative scarcity of No. 1 Foundry Iron, an ample supply and easy figures on No. 2 Foundry, and quite a demand for Gray Forge for pipe makers.

We quote standard brands : No. 1 Foundry, $19.50 @$21 ; No. 2, $18@$19 ; and Gray Forge, $16.50@ $18, with outside brands from $1@$1.50 lower. Foreign Bessemer is nominally $18.50@$19. There has been some business in Spiegeleisen for which $26 for 20 per cent could probably be shaded.

Scotch Pig.—The demand is exceedingly light.

We quote ex ship and to arrive : Langloan, $21.50; Summerlee, $20.75 ; Dalmellington, $20 ; Gartsherrie, $21 ; Eglinton, $19.25@$19.50 ; and Glengarnock, $20@$20.50.

At the Metal Exchange, the following cable quotations have been received : Coltness, 58s. 6d. ; Langloan, 57s. 9d. ; Summerlee, 53s. 6d. ; Gartsherrie 54s. 6d. ; Glengarnock, at Ardrossan, 50s. ; Dalmellington, 48s. ; and Eglinton, 44s. 9d. Warrants, 43s. 4d.

Steel Rails.—The only event of any consequence has been the closing of the New York Central contract of 12,000 tons at private terms. We quote $28@$28.50 at mill.

Old Rails.—The market has been dull. We quote $16.50@$17.

Philadelphia. Nov. 14.

[From our Special Correspondent.]

Pig-Iron.—The business public is impatiently waiting for a cessation of interfering influences. In pig-iron, there are a good many buyers ready to do business as soon as they see their way clear to it. A number of large and small buyers have been in the market within forty-eight hours. The outcome has not been much as yet. Offers have been made, and in some cases have been refused, while in other cases, they are under consideration. Outside prices for Forge iron, $17, for all excepting three or four makes. The inside price for any thing of a desirable character is $15.50. Four thousand tons of inferior stuff were sold for delivery at $14. There is more movement in forge than in any other kind, as mill-owners in different parts of the State are about out of stocks. There is some more inquiry for foundry iron, and there is a probability of an improving trade. In fact, some sales were made to-day, indicating a decided improvement in the prospects of the market. A good deal has been said about the arrivals of Southern iron. Two vessels have been unloading here, and there is a good deal of business going on, stimulated by favorable freights : but it is too soon to say whether much will grow out of it.

Foreign Irons.—Bessemer Pig is $19 ; 10 per cent Spiegel, $22.50 ; 20 per cent, $26 ; 30 per cent, $31 @$32.

Muck-Bars.—The continued selling of small lots is reported at $28@$28.50, while for the best makes $29@$30 is held, and occasionally paid.

Blooms.—No important sales of blooms have taken place.

Merchant Iron.—A good deal of complaint is made at the backwardness of demand. Good iron is worth 1·90c., and some manufacturers here do not care to take orders at less. As to the business done, it is of a very disappointing character. There is nothing in sight to indicate the possibility of an improvement, although it is known that consumers are about out of stocks.

Sheet-Iron.—The demand has fallen to even lower proportions.

Nails.—There is nothing promising to speak of. Prospects are poor. One or two concerns have just started to make steel nails, the Pottstown mill, for one. There is no remedy for the present over-production. Some mills run to full capacity, and others from one half to two thirds. Quotations are $2.10 for small lots.

Plate and Tank-Iron.—No new sales have been reported, and quotations must be repeated at 2·10c. for Plate ; 2·20c. for Tank ; 3·75c. for Flange ; 2·75c. for Shell.

Structural Iron.—A review of the market this week fails to develop a single interesting feature, and orders that were confidently expected two or three weeks ago have not been heard of, and are not likely to come to hand very soon. The standing quotations must be repeated.

Steel Blooms and Slabs.—Nail Blooms are selling at $32 ; Domestic Slabs, $32@$35 ; foreign Nail Blooms, the same. Small sales are made.

Wrought Pipes and Tubes.—Some very irregular prices have been named on business done this week, and there seems to be no way of inducing business to come in except by continuing the disastrous policy of shading prices. It would seem that bottom had long ago been reached, but old figures do not stand. Butt-Welded Black Pipe is nominally 45 per cent off ; Galvanized, 35 ; Lap-Welded Black, 65 ; Galvanized, 45 ; Boiler Tubes, 60 per cent off. Occasionally a little better price is secured for a small lot.

Steel Rails.—A few small lots of light sections have been sold at $32@$35, but outside of this, there is nothing new. It is impossible to give inside quotations for large lots of heavy sections for spring delivery, as there is no business of this character done.

Old Rails.—The demand for old rails is hard to characterize. There are inquiries, but no buyers. Prices do not suit ; $17@$17.50 is all that can be had, while $18@$18.50 are brokers' inside figures for T rails. Spot stocks are very light. Some quiet negotiations are going on for domestic rails, which are replaced by steel rails on some Southern roads.

Scrap Iron.—A good deal of Scrap has been selling lately, at least more than usual, but in trifling lots, at from $9@$19 a ton, according to quality. Selected lots are mostly wanted.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 14.

Anthracite.

Business in domestic sizes continues quite brisk al around, and prices are firm at $4@$4.10 for Stove coal. Other sizes show no improvement and no changes of any consequence.

Bituminous.

The tonnage is heavy, but prices are unsatisfactorily low, odd lots selling occasionally at apparently ruinously low figures.

Philadelphia. Nov. 15.

[From our Special Correspondent.]

Coal stocks at Port Richmond this afternoon are 98,000 tons. Freight rates to Boston have advanced to $1.15, and remain firm at that figure. There is a scarcity of special coals, and the supply will not overtake the arriving requirements for at least a month. Prices are firm for special coals, a fact that is favorably commented on by the trade. The local demand for stove and egg is increasing, but very slowly, on account of the fair weather and the apprehensions among buyers that prices will somehow or other break. A good many people have been led to believe that the retail coal dealers can sell best Lehigh at $5.75 and Schuylkill and other inferior coals at from 50 to 75 cents less, and this belief accounts for some of the backwardness in buying. But among manufacturers there are other reasons given, the chief one being that the industrial condition of this city has not for five years been as bad as it is at the present hour, and there are no prospects of any change. Less than 25 per cent of the producing capacity is on full. About 25 per cent of it is practically shut down, while the other half is working irregularly, and there are prospects that the idleness will increase. This extends to all branches of industry. The textile manufacturers are worse off than others. Reductions of wages have been made among carpet-weavers and weavers of other kinds of products and among machinists and founders and several other classes of iron-workmen. This condition of things tells heavily against the coal trade. The manufacturers are not buying. The withdrawal of this demand is a severe blow to the trade. There is a great deal of idleness through the eastern portion of the State. The fact that there are only 86

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales.
	Nov. 8.		Nov. 10.		Nov. 11.		Nov. 12.		Nov. 13.		Nov. 14.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.	.....	.....	.....	.....	.05	.....	.05	.....	.....	.....	.05	.....	5,800
Amie Con., Co.	.05	.....	.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Argenta	.....	.....	.....	.....	4.50	.....	.....	.....	.....	.....	.....	.....	25
Bassick, Co.	.....	.....	.51	.....	.53	.....	.....	.....	.....	.....	.45	.....	1,500
Belle Isle, Ne.	.....	.....	2.60	.....	3.00	2.70	3.00	.....	.....	.....	3.00	.....	850
Bodie Cons., Ca.	.....	.....	.....	.....	.....	.....	.20	.....	.....	.....	.....	.....	1,000
Breece, Co.	.58	.55	.....	.....	.56	.50	.....	.....	.....	.....	.....	.....	1,300
Bulwer, Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cal. & Hecla, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Castle Creek	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chollar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.95	.....	500
Cons. Cal. & Va.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.20	.....	200
Cons. Va., Ne.	.05	.04	.04	.03	.....	.....	.....	.....	.....	.....	.....	.....	1,800
Dunkin, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.23	.20	500
Eureka Cons., Ne.	3.25	3.00	3.05	.....	3.10	.....	.....	.....	.....	.....	3.20	.....	800
Father de Smet, Dk.	4.50	4.00	.....	.....	4.00	.....	.....	.....	.....	.....	.....	.....	220
Findley, Ga.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Stripe, Ca.	.....	.....	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	700
Gould & Curry, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Prize, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.25	.....	.....	.....	100
Green Mountain, Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, Ne.	3.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	300
Hall-Anderson, N. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Homestake, Dk.	.....	.....	.....	.....	9.75	.....	.....	.....	.....	.....	.....	.....	100
Horn-Silver, Ut.	5.00	4.75	5.00	4.65	4.75	4.25	4.70	4.50	4.70	4.25	4.75	4.25	10,472
Independence, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Co.	.....	.....	1.10	1.00	.....	.....	1.00	.95	.....	.....	.....	.....	1,800
Leadville C., Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Pittsburg, Co.	.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Martin White, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Navajo, Ne.	3.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Northern Belle.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Belle Isle, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario, Ut.	.....	.....	19.00	.....	.....	.....	.....	.....	19.38	.....	.....	.....	75
Ophir, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quicksilver Pref., Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., Ca.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson Cons., Co.	.40	.38	.40	.....	.....	.....	.47	.42	.....	.....	.....	.....	1,920
Savage, Ne.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sierra Nevada, Ne.	.....	.....	.....	.....	.75	.70	.....	.....	.....	.....	.....	.....	225
Silver King, Ar.	4.50	.....	.....	.....	.....	.....	5.00	.....	.....	.....	.....	.....	250
Spring Valley, Ca.	.....	.....	.....	.....	.....	.....	1.05	.....	.....	.....	.....	.....	100
Standard, Ca.	.58	.50	.50	.....	.56	.50	.55	.....	.56	.54	.55	.53	4,405
Stormont, Ut.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tip Top, Ar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vizina, Ar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Highest and Lowest Prices per Share at which Sales were Made.												Sales
	Nov. 8.		Nov. 10.		Nov. 11.		Nov. 12.		Nov. 13.		Nov. 14.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
American Flag	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barcelona, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bechtel Con., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belvidere	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & B'lcher, G. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Big Pittsburg, S. L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bradshaw, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bull-Domingo, S.L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cal., B. H., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Ariz'na, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Climax, Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado Central.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.70	.....	.75	.....	400
Cons. Imperial.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Pacific	.91	.90	.92	.90	.91	.....	.90	.....	.....	.....	.92	.91	.92	.91	2,850
Decatur	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Durango, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastern Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goodshaw, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harlem M. & M. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hortense, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mariposa Pref., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, G. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mono	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Standard, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Horn-Silv'r, S L.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pri'nt'l & Miller, S.	.....	.....	.....	.....	.....	.10	.....	.....	.....	.....	.....	.09	.....	.09	.....	200
Rappahannock, G.	.....	.....	.....	.....	.....	.....	.07	.06	.....	.....	.....	.07	.....	.07	.....	1,500
Red Elephant, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ruby, of Arizona.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cliff, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sonora Con.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bodie, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bulwer, G.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Hite.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Pacific.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State Line, 1 & 4, s.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Nos. 2 & 3, s.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel	.14	.13	.13	.....	.14	.....	.13	.12	.12	.11	.12	.....	7,000
Taylor Plumas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unadilla, S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union Cons., G. S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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Tables giving dividends and assessments will be printed the first week of each month. Dividend shares sold, 35,202. Non-dividend shares sold, 11,950.

furnaces in blast, and 135 out of blast, is a sufficient explanation of dullness in the manufacturing demand. Manufacturing establishments everywhere are running less than full-time. A feeling of gloom pervades trade circles in consequence; but with all of it there is an elasticity, due to the expectation of an early escape from our long political campaign. Vessels are loading with stove and egg sizes; but in many cases they are obliged to wait as long as ten days before being loaded. It is very probable that there will be a two-weeks' stoppage in December. Pea and broken coal are in over-supply. The Western shipments are much less than they would be were there more facilities. All the cars are sent West loaded as fast as received. The Southern demand is about at the regular average. The bituminous coal trade is as it always is. The figures of the Clearfield and Cumberland production have not arrived up to the present hour, but they are known to be but slightly different from those of last week.

Buffalo. Nov. 13.

[From our Special Correspondent.]

The weather for several days past has not been such as to make any demands upon our coal-bins except for cooking purposes, and our manufacturing establishments are working short hours. The result is dullness in the coal trade and grumbling among dealers. The coke trade is without any new features.

The election for President has been and is the all-absorbing topic of discussion; but as the conclusion arrived at by all parties is, that Grover Cleveland will take the chair on the fourth of March, this subject will not trouble us much longer.

The following items may be of interest in the absence of any startling incidents.

There has been and is a large accumulation of coal destined for the Dominion of Canada at this port, on the railroads. It is estimated that from 400 to 500 car-loads are awaiting shipment at East Buffalo and Black Rock yards. The Grand Trunk Railroad can move only a small quantity at a time because of the want of switch room at Toronto and other places over the border. This evil is not likely to be remedied this season; but hopes are entertained that some plan will be adopted next year by the Canadian receivers, whereby a remedy may be found.

The season of navigation on our lakes and canals—the great waterway from the Northwest to the seaboard—nears its close. The movement for the next few days will determine the quantities of tonnage carried during the year of the products of the mines, etc. Since my last letter, many sailing vessels, propellers, and consorts have gone into winter quarters. Charters on Saturday last closed dull, with coal scarce, and it was slow work getting vessels out of the way that were chartered several days before. The movement since has been light, although receipts were freer. There is a difference of opinion as to whether future freights will be higher; many vessel owners see no money in 75c. a ton, with wages at $3.50 a day per man; while others say that they may get around and pay expenses. This has reference, of course, to charters to Chicago, Milwaukee, Duluth, and upper lake ports.

The engagements by lake from Buffalo for the past week were at the following rates: 75c. to Chicago and Milwaukee, 25c. to Sandusky and Detroit, 90c. to Racine, and on contract or as ballast to Duluth.

Receipts by lake of coal for the past week, none.

Receipts by canal of coal for the first week of November, 9220 tons; shipments for the same period, 903 tons.

Receipts of coal by Lake Shore & Michigan Southern Railroad for the past week, 1185 tons; namely, 831 tons for Buffalo, and 354 tons for other points.

The shipments by lake of coal, from November 6th to 12th, both days inclusive, were 27,720 tons; namely, 19,310 to Chicago, 5060 to Milwaukee, 600 to Detroit, 550 to Racine, 600 to Sandusky, 1600 to Duluth.

The only coal charter by canal for the week was one boat-load to Newark at 80c., captain to pay loading and unloading charges.

The canals of the State of New York are the great factor in determining the cost of freight from the West to the East, and *vice versa*. Coal men are interested in the welfare of our canals. The following figures, as they are officially recorded by the United States Bureau of Statistics, are very suggestive. In 1868, the tonnage of the New York canals was 6,442,225 tons; of the Central Railroad, 1,846,599 tons; of the Erie, 3,908,243 tons. In 1883, the tonnage of the canal, despite the abolition of tolls, was only 5,664,056 tons; while the tonnage of the Central road was 10,892,440, and of the Erie 13,610,623. In 1868, the canal tonnage exceeded that of both the great trunk lines by nearly 1,000,000 tons, under a toll sheet. Last year, these roads carried nearly five times as much as the water way with the tolls abolished. The rate per ton per mile by rail was 2·453 cents in 1868; last year, it was but 1·055 cents per mile.

The receipts of coal at Duluth for the week ended November 8th were only 3960 tons; for the season of navigation to date, 277,647 tons. The shipments for 1884 are about over to this point.

Boston. Nov. 14.

[From our Special Correspondent.]

Both election excitement and unfavorably warm weather have worked against the anthracite coal trade of this port. Retailers have been out of the market. Then, too, the movement on their part to establish an advance of 25 cents a ton was not a success. It was not a popular move from the first, because it was thought by many that an advance of 25 cents would not amount to any thing, but that if the proposition had been for 50 cents advance, half of it might have been realized. As it was, all agreed to it but one dealer, but, owing to his refusal, it is dropped. It will be seen that the Boston public is in no danger of having to pay more for its coal than it is actually worth. The real reason that the movement for an advance failed seems to be that it was not positively necessary just yet, and the low margin of profits here based upon the existing sharp competition did not permit it.

Wholesalers look for a better anthracite demand very soon, and it will be hastened if the advance in freights holds. Retailers are putting out a good deal of coal, and must shortly do more buying themselves than they have in the past month.

F. o. b. prices remain unchanged, and the trade is not anticipating any change for the present. Owing to the recent curtailment, stocks have been reduced, and, with the curtailment still to come, the situation is one in which dealers may place confidence. Only broken size appears to be a drug in the market. We quote f. o. b. prices as follows:

At New York, Stove, $4@$4.15; Broken and Egg, $3.50@$3.65; Pea, $2.40; individual coals, $3.75@$3.90 for Stove, $3.25@$3.50 for Broken and Egg. At Philadelphia, $3.90@$4 for Stove, $2.20 for Pea, $3.30@$3.50 for Broken and Egg. Special coals, $4.85@$5 for Broken, $5.35@$5.50 for Stove.

Jobbers who have pockets are reporting a very fair trade, noting sales of Stove white ash at $5.35@$5.50

a ton. The scarcity of Lykens Valley coal has just caused another advance of 15 cents a ton in that coal, from $6.85 to $7 for egg and stove.

There is no movement in bituminous coal worth mentioning. Jobbers are only exercised to see that their contracts are filled on the lowest obtainable freights.

There has been a further advance in freights this week, and it looks as if the advance had staying powers.

We quote: New York, $1@$1.05; Philadelphia, $1.10@$1.15; Baltimore, $1.15@$1.20; Newport News, $1.10@$1.15; Richmond, $1.20; Cape Breton, $1.60; Bay of Fundy, $1.55.

Retail demand is fair, but an improvement is looked for this month with the advent of really cold weather. As yet we have had none. Prices remain unchanged, for reasons noted above. The advance will doubtless come later on without being forced. We quote:

White ash, furnace and egg	$5.50
" " stove and nut	5.75
Red ash, egg	6.00
" " stove	6.25
Lorberry, egg and stove	$6.75@ 7.00
Franklin, egg and stove	7.50
Lehigh, furnace, egg, and stove	5.75
" nut	5.75

Wharf prices, $4.50 for Broken, $4.85 for Stove.

One of the pleasant occasions in the coal trade of last week was the reception given at Young's Hotel by Gay & Parker, Kilby street coal jobbers, to President Claghorn and Superintendent Blight, of the Bernice coal mines. About thirty retailers from different sections of New England were present.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended November 8th, and year from January 1st:

Tons of 2240 lbs.	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Wyoming Region.				
D. & H. Canal Co.	46,510	3,250,633	100,442	3,530,060
D. L. & W. RR. Co.	65,434	4,282,536	111,039	4,342,730
Penna. Coal Co.	20,899	1,099,739	40,051	1,294,292
L. V. RR. Co.	11,099	1,160,188	28,410	1,202,750
P. & N. Y. RR. Co.	2,064	188,330	5,281	186,179
C. RR. of N. J.	*	*	*	1,202,078
Penn. Canal Co.	15,917	395,571	15,917	447,344
North & West Br. RR.	17,811	699,123	17,276	430,739
	179,734	11,076,120	318,416	12,636,172
Lehigh Region.				
L. V. RR. Co.	71,557	3,856,888	105,930	4,335,047
C. RR. of N. J.	*	*	*	1,126,889
S. H. & W. B. RR.	1,128	134,301	1,956	33,406
	72,685	3,991,189	107,886	5,495,342
Schuylkill Region.				
P. & R. RR. Co.	144,202	9,354,175	295,726	8,223,073
Shamokin & Lykens Val.	*	*	*	950,363
	144,202	9,354,175	295,726	9,173,436
Sullivan Region.				
St Line & Sul. RR. Co.	1,746	62,485	1,466	59,016
Total	398,367	24,483,969	723,494	27,363,966
Increase				
Decrease		2,879,997		

* Included in tonnage of the Philadelphia & Reading Railroad.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1879.....22,735,602 tons
" " " " 1880.....20,089,788 "
" " " " 1881.....24,176,670 "
" " " " 1882.....24,965,258 "

Comparative Statement of the Production of Bituminous Coal for the week ended November 8th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Cumberland Region, Md.				
Tons of 2240 lbs.	64,199	2,474,234	44,111	2,182,959
Barclay Region, Pa.				
Barclay RR., tons of 2240 lbs.	6,068	254,467	7,995	281,739
Broad Top Region, Pa.				
Huntington & Broad Top RR., of 2240 lbs	3,645	169,500	3,482	166,797
East Broad Top	.....	.....	669	36,892
Clearfield Region, Pa.				
Snow Shoe	3,051	155,203	7,529	213,600
Karthaus (Keating)	1,585	46,600	.....	.....
Tyrone & Clearfield	59,341	2,686,920	61,976	2,416,359
Alleghany Region, Pa				
Gallitzin & Mountain	10,603	349,029	10,282	378,138
Pittsburg Region, Pa.				
West Penn RR.	5,644	243,574	4,451	332,803
SouthwestPenn. RR.	2,155	108,277	2,972	102,712
Pennsylvania RR.	6,410	239,525	16,093	542,252
Westmoreland Region, Pa.				
Pennsylvania RR.	22,555	1,123,085	29,141	1,174,378
Monongahela Region, Pa.				
Pennsylvania RR.	3,141	133,117	.....	.....
Total	188,397	7,983,526	188,701	7,828,629
Increase	.....	154,897	.....	.....

The increase in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 170,993 tons, as compared with the corresponding period in 1883.

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended November 8th, and year from January 1st:

Tons of 2000 pounds.

	1884. Week.	1884. Year.	1883. Week.	1883. Year.
Gallitzin & Mountain (Alleghany Region)	2,998	117,035	1,548	67,249
West Penn. RR.	.....	24,865	3,854	94,229
Southwest Penn. RR.	30,851	1,811,410	41,596	1,810,179
Penn. & Westmoreland Region, Pa. RR.	4,380	168,373	4,117	188,358
Monongahela, Penn. RR.	1,578	62,840	.....	.....
Pittsburg Region, Pa. RR.	.....	136	1,614	13,968
Snow Shoe (Clearfield Region)	618	19,941	401	16,060
Total	40,425	2,204,600	53,130	2,190,043
Increase	.....	14,557	.....	.....

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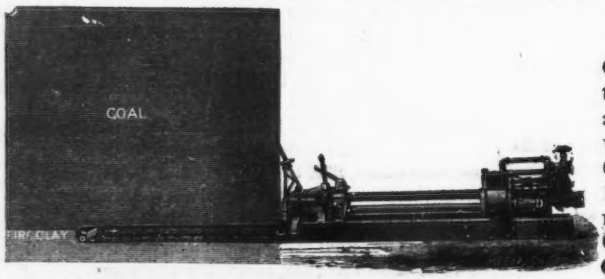

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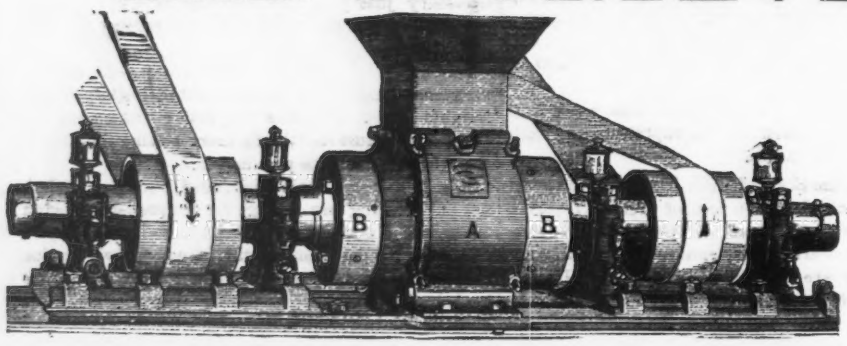

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